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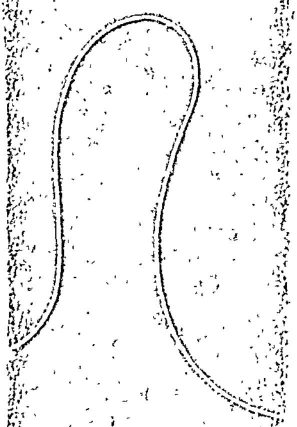

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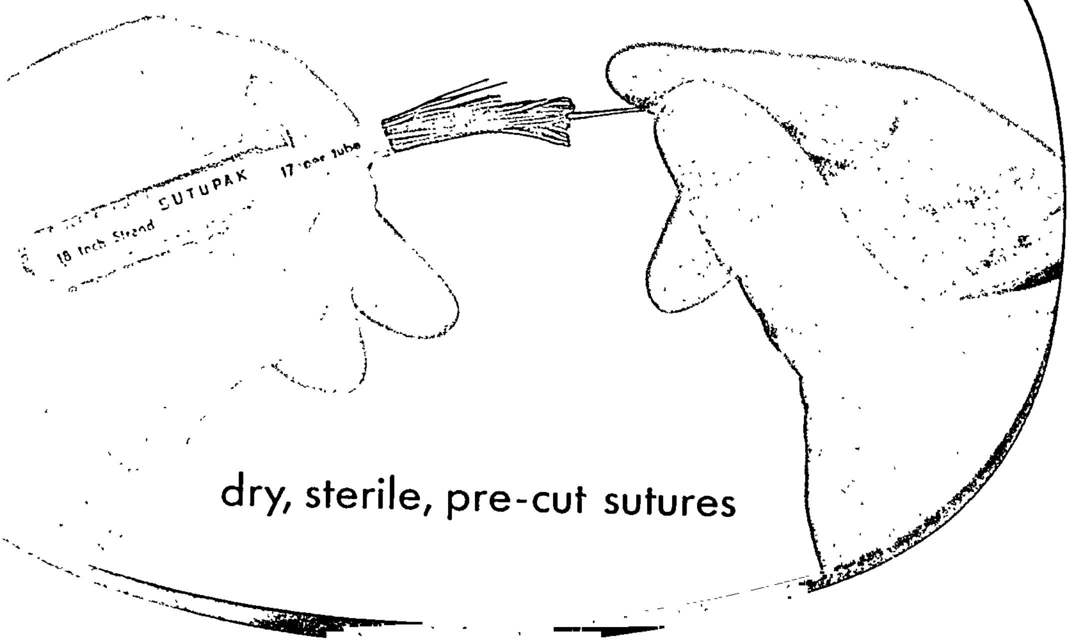

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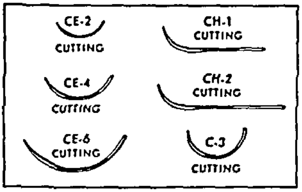

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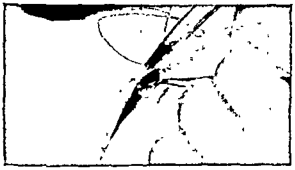

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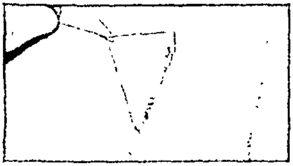

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The Ninth International Congress will be held from April 26 to May 2, 1954. The official topics are (1) experience with socialized medicine in different countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the **Fourth Centennial of the city of São Paulo,** it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commemorative activities of São Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure a good program, all who are interested are requested to write to the address below.

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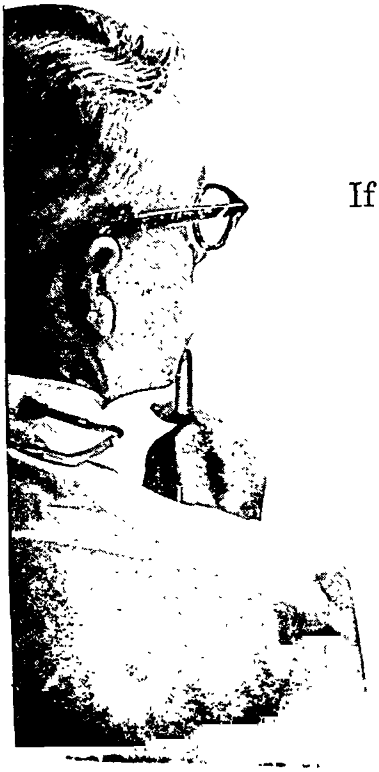

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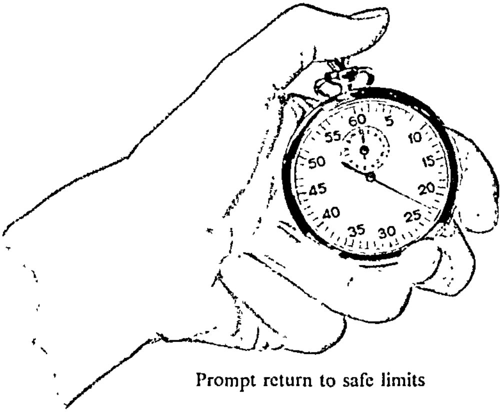

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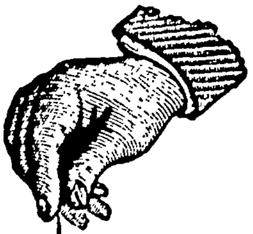

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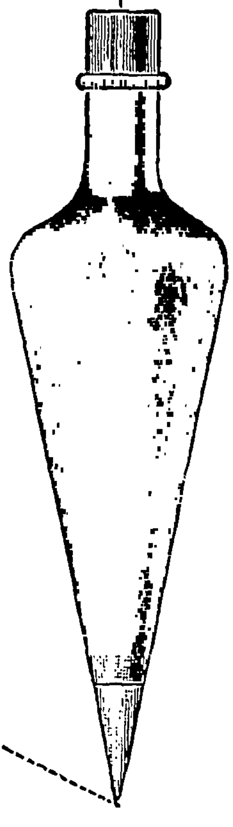

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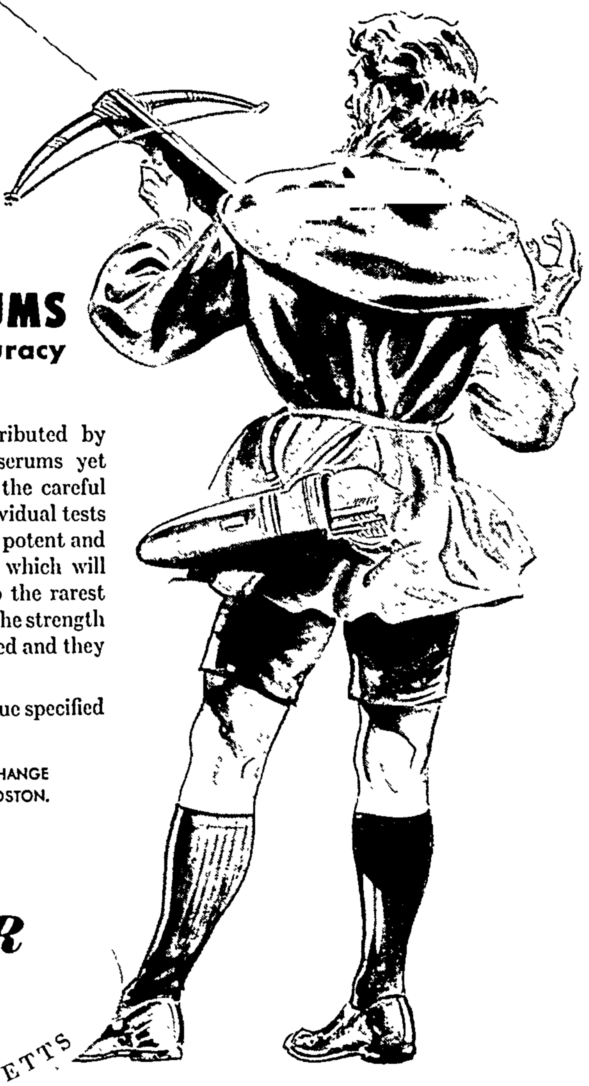

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Newer Trends in the Treatment of Old Congenital Dislocations of the Hip

JULIUS HASS, M.D., F.I.C.S.
NEW YORK CITY, NEW YORK

IT is well known that the indications for reduction treatment of congenital dislocation of the hip are limited. Generally, the upper age limit for closed reduction in cases of unilateral dislocation is the end of the sixth year, and in cases of bilateral dislocation the end of the fifth year. Open reduction likewise has its age limits; indeed, Colonna,[1] one of the leading exponents of open reduction, has stated that his operation is not suitable after the age of 10 years for unilateral dislocation or after the age of 8 years for bilateral dislocation.

Beyond these age limits, the difficulties of treatment multiply rapidly and after puberty may become insurmountable. Reduction of the femoral head into the acetabulum may be difficult owing to shortening of the soft parts, but failure of the treatment may follow even successful reduction because of secondary changes in the acetabulum, which has been inhibited in its growth and with progressive disorganization may finally become wholly useless for functional adaptation.

The treatment of old congenital dislocation of the hip in adults, therefore, presents a difficult problem. It should be emphasized, however, that active intervention is not necessary in all cases. In some, the dislocated femoral head has achieved so favorable an apposition to the wall of the pelvis, in the form of a highly developed secondary acetabulum, that the hip gives rise to only slight difficulty. In the majority, however, serious symptoms develop, such as pain, fatigue on walking, a marked limping gait and a hideously deformed body.

The evolutionary development plastic [illegible]

Read at the meeting of the orthopedic section on Orthopedics, United States and Canadian Chapters, of the International College of Surgeons, New York, Sept. 15, 1953.
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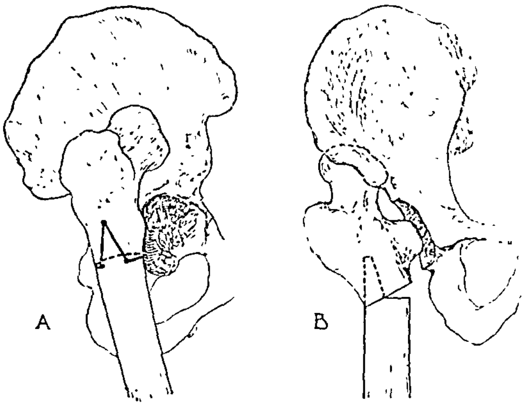


Fig. 1.—The author's method of subtrochanteric osteotomy for old congenital dislocation of the hip. *A*, lateral view, showing an interlocking osteotomy produced by formation of a triangular plug and slot in the outer surface of the femoral shaft beneath the lesser trochanter. *B*, anterior view, showing the divided femur and the lesser trochanter displaced into the acetabulum.

attempted to cope with these forms of congenital hip dislocation, in order to afford relief from pain and disability.

Arthroplasties. — In 1948, Smith-Petersen[2] reported 40 cases, including 10 cases of bilateral dislocation, in which his vitallium mould arthroplasty was employed. The youngest patient was 13 years old, the oldest 60. Smith-Petersen was apparently most satisfied with his results. He attributed his success chiefly to the mesial transplantation of the femoral head into a new and deep acetabulum. "This results in stability and improved muscular leverage so that the Trendelenburg sign is markedly diminished." Further information on this interesting report is missing and unfortunately no more available.

Law,[3] an ardent advocate of Smith-Petersen's mould arthroplasty, reviewed his own series of 16 cases after vitallium arthroplasty for congenital dislocation of the hip; in 4 of these the arthroplasty was bilateral. The average age at the time of operation was 34½ years and the follow-up period two to six years. Postoperative dislocation occurred twice and postoperative sepsis once. In 1 case a revision of the arthroplasty was necessary in order to secure a better relation between the mould and the new joint surfaces. In another, absorption of the femoral head within the mould necessitated reoperation. In his series, however, the acquired range of movement and the improvement in gait and posture placed the results among the most satisfactory in arthroplasty.

In the same year, Bickel and Babb[4] of the Mayo Clinic reported 10 cases, including 2 of bilateral dislocations, in which cup arthroplasty was used. The results were evaluated as very good in 20 per cent, good in 60 per cent, and only fair in 20 per cent. The age of the patients was not given.

In an end-result study from the New York Orthopedic Dispensary and Hospital, Stinchfield and Carroll[5] (1949) reported that 5 of 45 vitallium-cup arthroplasties had been performed for congenital dislocation of the hip. The average age of the patients was 23.9 years. The results were regarded as satisfactory in only 3 cases. In the other 2, the patients required a revision of the arthroplasty, 1 after five years and the other after two years.

A newer prospect in the treatment of old congenital dislocation of the hip has been offered by the brothers Judet[6] (1950), who replace the femoral head by an acrylic prosthesis. In a series of 400 patients operated upon for various hip disabilities, such as osteoarthritis and ununited fractures of the neck of the femur, there were 108 adult patients with congenital dislocations of the hip, including 31 cases of subluxation and 77 cases of complete dislocation (43 cases of anterior dislocation and 34 cases of posterior dislocation). A review of the results after a lapse of five years revealed good results in 30.7 per cent of anterior dislocations and in 35.7 per cent of posterior dislocations. Fair results were obtained in 53.8 per cent of anterior and 35.7 per cent of posterior dislocations. Results were poor in 15.3 per cent of anterior dislocations and in 28.5 per cent of posterior dislocations. Both movement and stability were frequently improved, but results as regards the limping gait were disappointing.

The Judets emphasize the undue tension

in the blood vessels, nerves and muscles observed by them in their earlier attempts to form the new joint as near as possible to the normal site. They had 2 cases of paralysis of the femoral nerve and 1 of paralysis of the sciatic nerve. They are now less ambitious and are satisfied with reaming out the socket as far forward as possible under the iliac spine, in order to correct the lumbar lordosis. If the iliac bone is not thick enough at this site to permit sufficient depth of the socket, they deliberately perforate the ilium and pack bone fragments around the new acetabulum to form a shelflike socket.

A most valuable analysis of results following arthroplasty for congenital dislocation of the hip in adults was presented by D'Aubigne[9] (1952), who used both Smith-Petersen's vitallium mould arthroplasty and Judet's acrylic head replacement. His study is based on 32 operations performed on 28 patients. All were over 18 years of age. There were complete dislocations in all cases (in 1 case one hip was completely dislocated, the opposite hip subluxated). The dislocation was anterior in 6 cases, high posterior in 18 and intermediate in 8. Operation was recommended only for patients showing severe functional disability. Smith-Petersen's vitallium cup was employed in 16 cases and Judet's acrylic head in 13, the latter method being particularly useful when the head and neck of the femur were small and atrophic. Reduction was sometimes accomplished with surprising ease in young patients, but was difficult or impossible in the aged and those in whom arthritic changes had taken place. Redislocation occurred in 7 cases, and sciatic pain was observed in 6, but no paralysis of the femoral or sciatic nerve was encountered.

Results can be assessed only for the first 14 operations, on 12 patients performed before January 1950. Of these, 4 showed very good results; 6 patients with 8 operations showed good results, and in 2 patients the results were poor. Mobility was greatly reduced in a number of cases. The formation of a shelf to correct the sloping roof of the acetabulum probably increases rigidity of the joint. Some of the anatomic results, as shown in the roentgenograms, are impressive. However, D'Aubigné admits that, even when the roentgen appearance of the hip is almost normal, the functional result may be imperfect.

In order to overcome the obstacles to reduction and to avoid the risks involved in forced reduction, an attempt was made to relieve the tension of the great thigh muscles by *shortening* the femur.

Arthroplasty with Shortening of the Femur.—This method was first described by Hey Groves[8] in 1927. In his operation, a segment of the femoral shaft about 2 inches (5 cm.) long is removed below the lesser trochanter. With this shortening of the femur, the head can be brought down until it is on a level with the acetabulum. After the socket has been deepened, the head can be reduced into it. The ends of the femur fragments are then united over a bone peg.

Mercer,[9] who tested this method, found that, in spite of the removal of a large section of the femur, it was still no easy matter to reduce the head into the acetabulum, and that extensive denudation of the upper fragment was required to permit adequate mobilization of the central fragment.

In the following year (1928), Swett,[10] quite independently, employed a similar method of open reduction and shortening of the femur. He performed an oblique osteotomy below the lesser trochanter, permitting the fragments to overlap. Seven hips were operated upon in 5 patients, the oldest patient being 14 years of age. The results were equivocal.

The method of femoral shortening was recently adopted by Farill.[11] In his operation the bone fragments are united by an intramedullary nail. His series consisted of 9 patients with operations performed on 12 hips. He expressed great enthusiasm about results in children under 6 years of age, but thus far he does not recommend the operation for older patients.

D'Aubigné, in the publication aforementioned, showed the roentgenogram of a

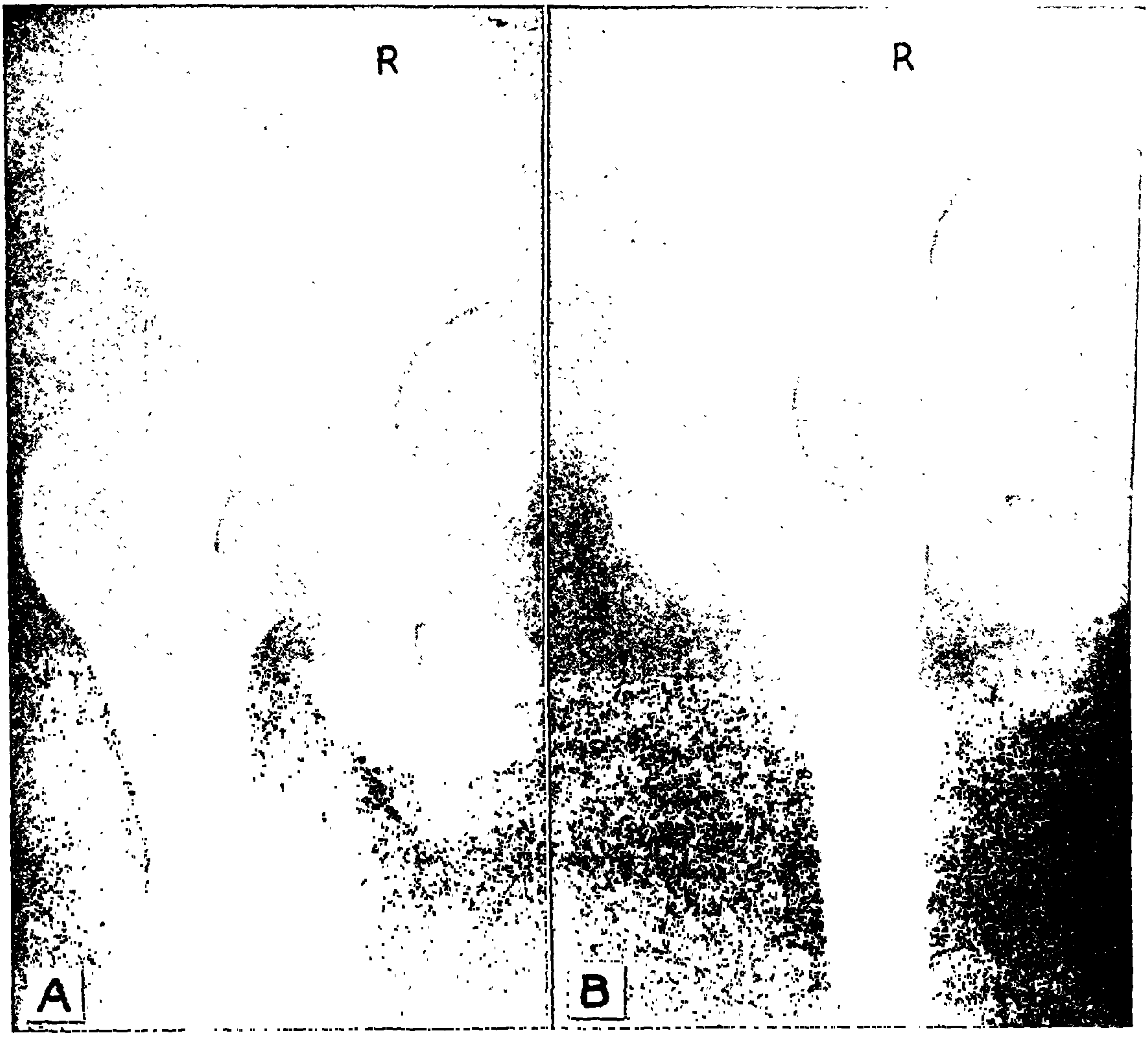


Fig. 2.—*A*, congenital dislocation of the right hip (luxatio supracotyloidea) in a woman aged 32. *B*, same patient two years after operation. There is excellent pelvic support at the site of the acetabulum; patient has freedom from pain and full range of motion.

patient aged 19, in whose case a cup arthroplasty was combined with a diaphyseal resection and nailing of the fragments. Ten months later there was no pain and only a slight limp.

A somewhat different method has been described by Zahradnícek.[12] In his operation a trapezoid-shaped resection of the femoral neck is carried out, which shortens the femur and simultaneously corrects both the coxa vara and the anteversion.

Leveuf[13] has used a technic similar to that of Zahradnícek in a series of 95 dislocations, 81 in children between 3 and 15 years of age, and 14 in persons between 15 and 33. A fair reduction was obtained in 77 per cent of the young patients and in 13 of the 14 adults. In the 1 patient with a poor result, necrosis of the femoral head developed. In contrast to the good anatomic results, mobility was poor in all 13 cases. "In other words, there was not a single satisfactory result."

From these reports one may conclude that the method of shortening the femur, although ingenious in its conception, has thus far failed to yield satisfactory results in adults.

COMMENT

In reviewing the current reports on arthroplasty, one may say that considerable advance has been made in recent years, and that Smith-Petersen's vitallium mould arthroplasty and Judet's acrylic head replacement both signify an important step forward, not only for all forms of arthritis of the hip, but also for old congenital dislocations thereof. But, with all due admiration for these conquests of operative technic, the fact remains that favorable results were obtained only in a limited number of cases. Even the results of arthroplasty with shortening of the femur fall short of what the surgeons had expected to accomplish. Redislocations due to the muscular tension that persists after reduction are not uncommon. In this respect, the mould arthroplasty with its movable cup is particularly exposed to displacement. In other cases there may be a tendency to stiffness occurring as a result of continuous intraarticular pressure or bone proliferation around the femoral neck. In the presence of a high dislocation with marked shortening of the soft parts, there is also considerable risk of injury to the femoral or the sciatic nerve, owing to protracted forced reduction. This serious complication was encountered by Judet and D'Aubigné and is in accordance with the empiric knowledge of all orthopedic surgeons of the past who dared trespass beyond the accepted age limits. Whether the newer surgical approach will change this picture in the future remains questionable.

I am convinced that complications and

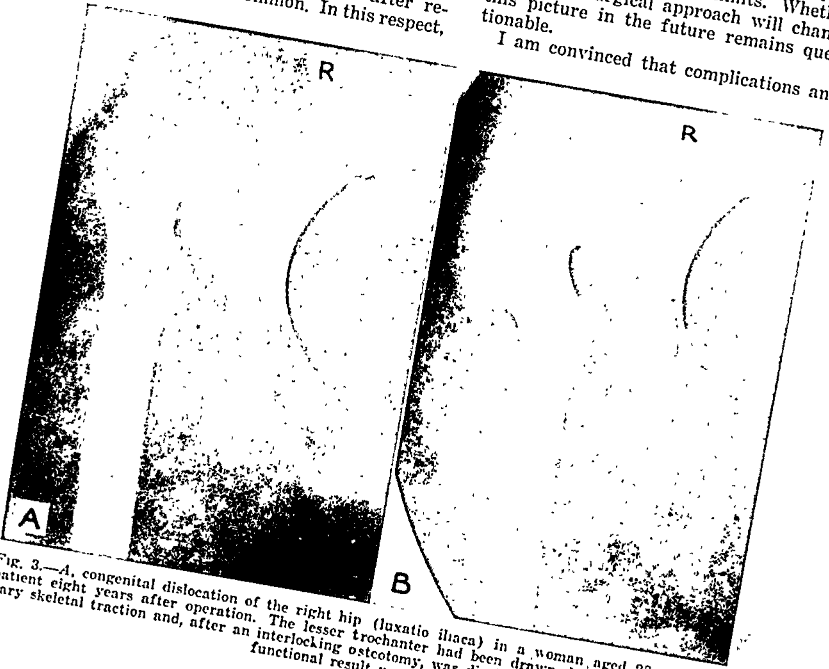


FIG. 3.—*A*, congenital dislocation of the right hip (luxatio iliaca) in a woman aged 28. *B*, same patient eight years after operation. The lesser trochanter had been drawn downward by preliminary skeletal traction and, after an interlocking osteotomy, was displaced into functional result was perfect.

poor results following arthroplasty will be avoided only when the *indications* for arthroplasty for old congenital hip dislocations are clarified and the limitations of the procedure well defined.

First of all, in analyzing the competent factors in the problem, one should keep in mind the specific anatomic relation between the femoral head and the acetabulum in the presence of such a dislocation. In contrast with the general picture in other hip disabilities, such as osteoarthritis, for which arthroplasties were first designed, the chief problem in treating congenital dislocation is the displacement of the femoral head, with all its associated features, particularly the lack of stability. Therefore any rational treatment in these cases should have the fundamental objective of establishing a pelvic support at the site of the *original* acetabulum. Failure to accomplish this will inevitably be followed by functional insufficiency of the hip, a limping gait and instability.

The efficiency of arthroplasty for old congenital dislocations of the hip, no matter what method is employed, depends upon two main factors: (1) whether the femoral head can be successfully brought down without undue force to the site of the original acetabulum or close to its level, and (2) whether the bone mass at the site of the new acetabulum is thick enough to permit sufficient deepening of the socket.

With these points in mind, it is evident that arthroplasty is not suitable in all cases, but only in those in which there is *minor* displacement, i. e., for *subluxation* and for *supracotyloid dislocation.** Judet's method may prove superior to the cup arthroplasty in all cases in which the femoral head is too large or too small, or is markedly deformed and degenerated. The use of an acrylic head will also require a smaller cavity than that provided by a vitallium cup filling part of the socket.

For *irreducible supracotyloid dislocations* and for all *iliac dislocations,* however, there remains, in the present state of surgical knowledge, only one method for consideration, namely, *subtrochanteric* osteotomy.

Subtrochanteric Osteotomies.—As early as 1894, Kirmisson[14] had suggested subtrochanteric osteotomy for the treatment of old irreducible hip dislocations, leaving unanswered, however, the question as to whether, and at what site, the pelvis was to be supported. Kirmisson had in mind only the prevention of the adduction contracture and lumbar hyperlordosis so constantly associated with the old congenital dislocations. Subsequently, subtrochanteric osteotomies were also employed by other orthopedists. Since the results were not entirely satisfactory, this method gained no general recognition and gradually passed into disuse.

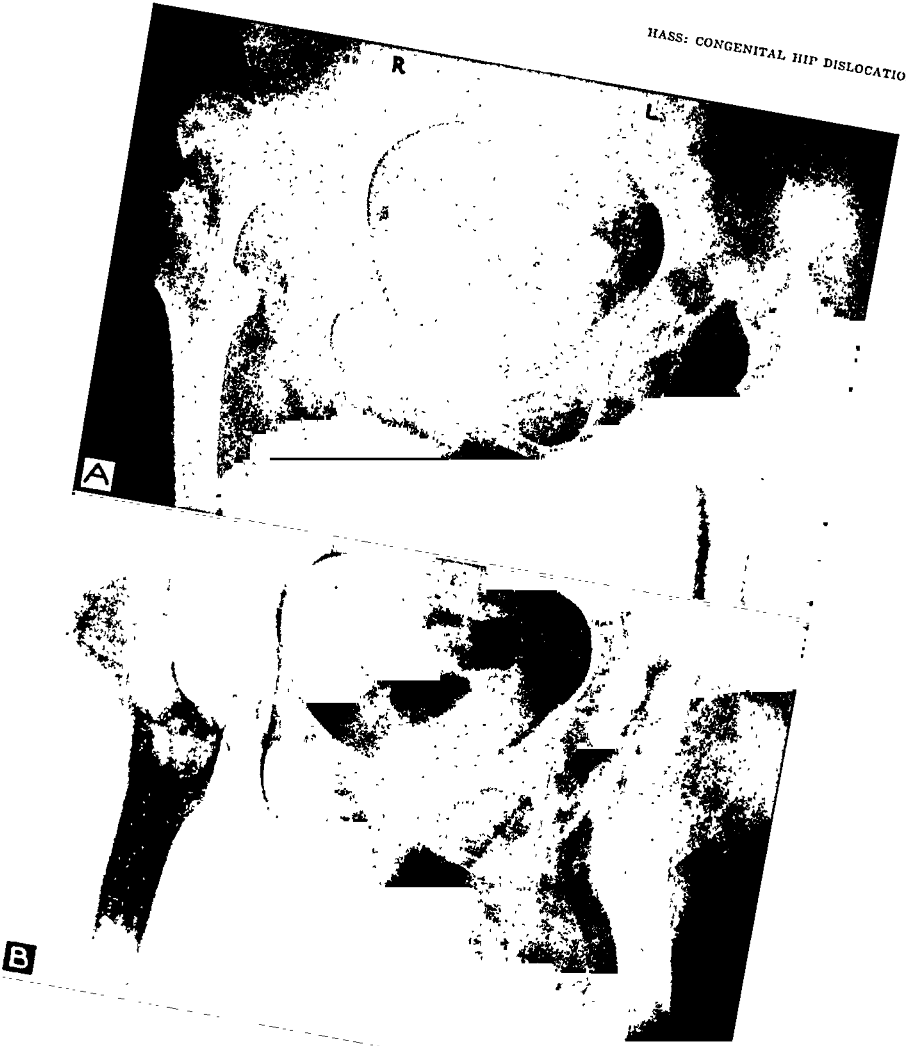
Lorenz[15] (1919) deserves credit for being the first to perform, intentionally, a subtrochanteric osteotomy in such a manner as to provide a bony support for the pelvis at the site of the acetabulum, instead of suspension by muscles and ligaments during weight-bearing. According to the method of Lorenz, which he chose to designate as "bifurcation," an oblique osteotomy is performed with the proximal end of the distal fragment below the lesser trochanter. The ends of the fragment are displaced so that the upper end of the distal fragment lies in the site of the acetabulum.

At the same time, von Baeyer[16] also recommended a subtrochanteric osteotomy for support of the pelvis in the region of the acetabulum, in which, however, the

---

*To indicate position I prefer, instead of "anterior," "intermediate" and "posterior," the more accurate terms "supracotyloid," "supracotyloid and iliac," and "iliac" dislocation.

Fig. 4. (opposite)—*A*, bilateral congenital dislocation in a girl aged 16 (luxatio supracotyloidea et iliaca). The patient complained of severe pain and had marked disability. *B*, same patient ten years after operation. There is excellent pelvic support on both sides. The patient is free from pain, walks without a limp and has full range of motion except for slight limitation of adduction. (Note the increased density of the shaft, indicating that weight-bearing takes place at the site of the acetabulum and is transmitted to the lesser trochanter and femoral shaft.)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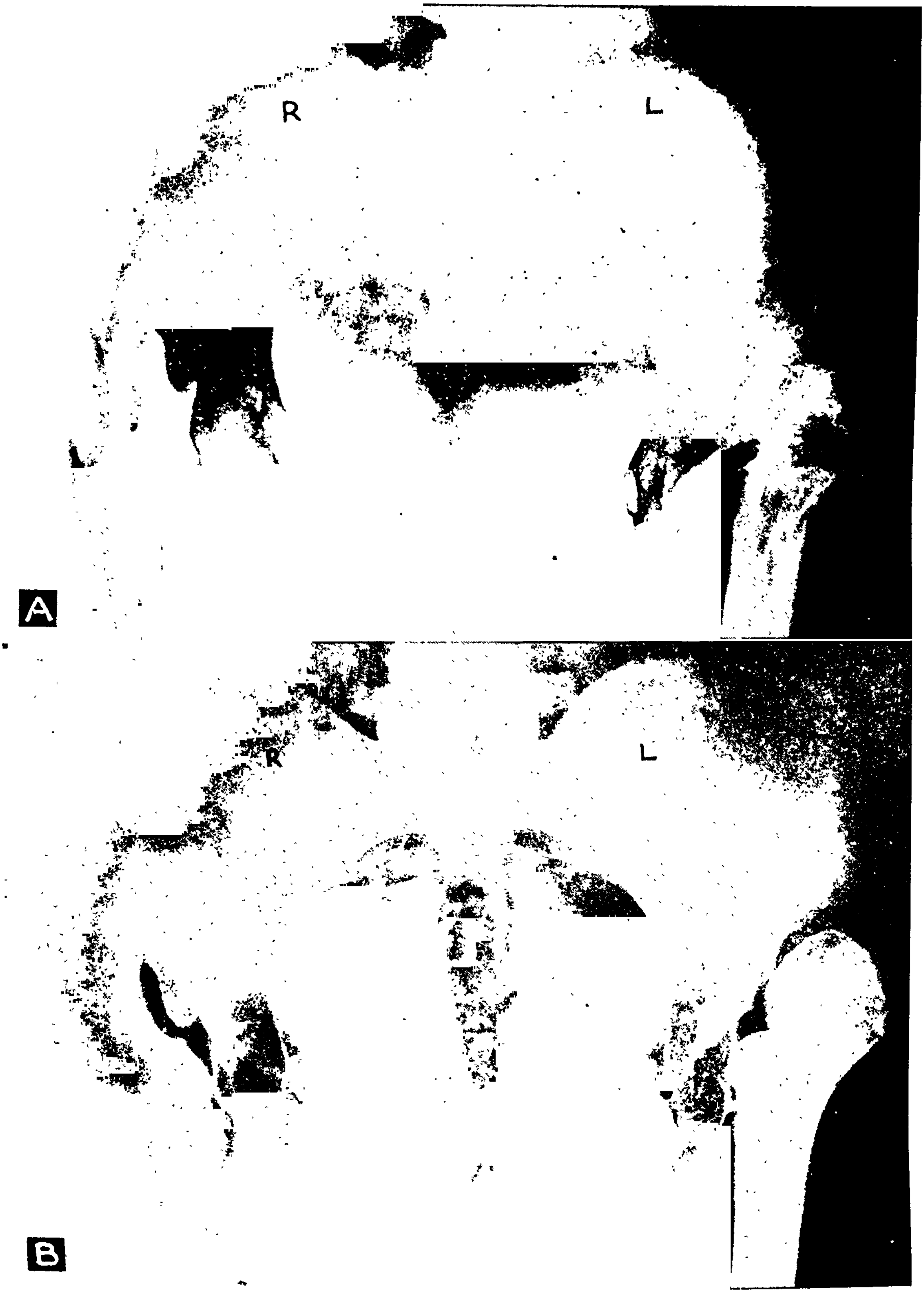
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principal emphasis was placed on the tension of the pelvitrochanteric muscles after satisfactory change in position.

Whereas the Lorenz bifurcation and von Baeyer's osteotomy sought to support the pelvis at the physiologic location, i. e., the site of the acetabulum, this was not the aim of the "low" osteotomy suggested later (1922) by Schanz.[17] In the latter procedure the osteotomy is carried out at the level of the ischial tuberosity; object is to control the Trendelenburg phenomenon and thus improve the gait by apposition of the medial angle of the osteotomy against the lateral pelvic wall. The support of the pelvis in the Schanz osteotomy is not direct but oblique, and there results a gliding mechanism that provides only questionable security. The patients that I have had occasion to observe after they had undergone a Schanz osteotomy also displayed a severe degree of genu valgum, so that in some instances I was obliged to perform a "repeat" osteotomy to restore at least the preoperative status.

The Lorenz and von Baeyer methods also encountered many opponents. Their objections were concerned chiefly with the pain and diminished mobility that seemed to follow these operations. It was assumed that the bone spike formed by the upper end of the osteotomized shaft and directed against the acetabulum was the cause of the pain and limited mobility.

These objections led me[18] in 1943 to modify the subtrochanteric osteotomy by displacing the *lesser trochanter* into the acetabulum as the point of support and transposing the osteotomized shaft of the femur beneath the lower end of the upper fragment. The lesser trochanter, because of its round smooth surface, presents a most suitable substitute for the head of the femur, being capable of restoring stability to the hip and at the same time insuring freedom from pain and adequate mobility.

Operative Technic.—The technic has been recorded in previous articles, but has now been improved and is significant enough to warrant restating.

The patient is placed on the operating table in the supine position, so that the side of the hip is readily approachable. Through a longitudinal incision, 4 or 5 inches (10 to 12.5 cm.) below the greater trochanter, the lateral subtrochanteric aspect of the femur is exposed. The incision is carried down through the periosteum, which is stripped and retracted with the muscles. An *interlocking* osteotomy is then performed just below the lesser trochanter. This is accomplished by forming a triangular plug and a slot on the outer surface of the femur, to prevent sliding of the fragments and to insure solid bony union at the site of the osteotomy (Fig. 1). To facilitate this procedure, drill holes are placed to mark the corners of the triangle on the outer surface of the femur. Division is then carried out by cutting the triangular plug and transverse division of the inner cortex of the shaft with a narrow osteotome.

After the osteotomy is completed, and while the leg is gently abducted with one hand, the thumb of the other hand is pressed against the lower end of the upper fragment. In this manner, the *whole upper fragment is adducted and the lesser trochanter directed toward the original acetabulum.* No slipping is possible, since the two fragments are interlocked (Fig. 2). In some cases, in which there is a very high iliac position, it may be necessary to bring the lesser trochanter down to the level of the acetabulum by preliminary skeletal traction (Fig. 3).

The postoperative *angle* of abduction at the site of the osteotomy should not exceed *40 to 50 degrees* in cases of *unilateral* dislocation, which can be readily compensated for by the pelvic tilt. For *bilateral* dislocation, however, special caution must be used in the abduction because of the possible difficulty in bringing

Fig. 5 (opposite)—*A*, bilateral congenital dislocation in a woman 41 years of age. There is position on both sides (luxatio supracotyloidea et iliaca on the left side and luxatio iliaca on t side). The patient had severe pain and was almost totally disabled. *B*, same patient two operation. She is free from pain, walks without a limp and has suffi of the legs into parallel alignment after the osteotomy. In these cases the abduction angulation should be limited to *30 or 40* degrees (Fig. 4). On the other hand, if the dislocation is bilateral, the pelvis is checked on both sides by the thrust of the lesser trochanters, so that less abduction is required than when it is unilateral. Particular difficulties may be encountered with bilateral dislocations in which the position is *unequal*; for example, with a supracotyloid position on one side and an iliac position on the other. As a rule, the higher up and the farther laterally removed the lesser trochanter is from the acetabulum, the more abduction will be necessary to bring the lesser trochanter closer to the acetabulum (Fig. 5). Since the dislocated head in the iliac position is posterior, the osteotomy angle should also be directed posteriorly to a slight degree. Thus the fragments form an angle opening outward and slightly backward. With regard to rotation, a slight inward rotation of about 10 degrees is advisable in order to compensate for a postoperative tendency toward outward rotation. In any case, the degree of angulation is the most delicate part of the procedure and should be carefully calculated preoperatively, and checked by roentgenograms during operation. The wound is then closed, and a long plaster spica is applied, extending from the toes to the axillae.

In almost all cases, a *preliminary subcutaneous adductor tenotomy* is necessary to overcome the adduction contracture associated with old congenital hip dislocations, in order to prevent loss of the abduction angle after the operation. Eight weeks after the operation the knee is freed and metal hinges are incorporated in the cast on both sides of the knee, so that the joint may be flexed. As a rule, bony union at the site of the osteotomy is sufficiently solid after three months to permit removal of the plaster and the resumption of weight bearing.

In recent times, internal fixation by means of a Moore-Blount blade-plate has been used to secure the angulation and to avoid the use of a plaster cast (Fig. 6).

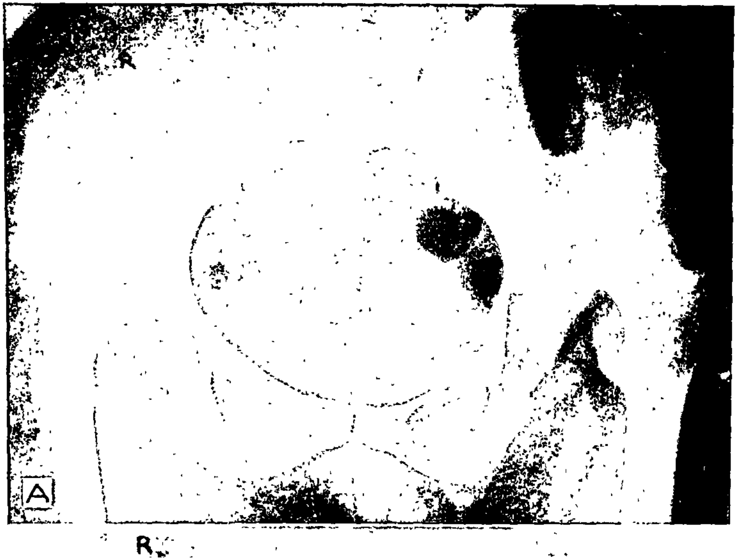
In cases of the bilateral condition it is advisable to perform the operation on one side first, and then on the other side after a lapse of three to four weeks. In 1 case, however, the entire bilateral operation was completed in one stage.

To avoid any disturbance of growth, the operation should not be performed on children before puberty.

End Results.—In 1943 I reported a series of 18 cases in which this method was used. Subsequently this number was increased by 7 additional cases, a total of 25, including 8 cases of bilateral dislocation. Twenty-one of the patients were female and 4 were male. The age of the patients at the time of operation ranged from 16 to 46 years, the average age being 32. At present, all have been observed for more than five years.

The end results are as follows: In the great majority of cases, i. e., in about 80 per cent, the results are good, and of these, 50 per cent are very good. The pathologic hyperlordosis disappeared. The patients are free from pain, the Trendelenburg sign is negative, and the limp is scarcely noticeable. All patients have an adequate range of motion. In 20 per cent of the cases the results are less favorable, but in no case is the condition worse than it was prior to operation. The failures are attributed to faulty position of the fragments, to excessive abduction, or to postoperative loss of angulation. They could be traced to technical errors during the operation or to too early weight bearing.

Fig. 6. (opposite)—*A*, bilateral congenital dislocation of the hip in a man 35 years of age (supracotyloid position on the left side and iliac position on the right). The patient had severe pain and was unable to walk. He had marked limitation of motion due to arthritic changes in the secondary acetabulum. *B*, same patient three years after operation. An interlocking osteotomy was performed, and a Moore-Blount blade plate was used to secure the postoperative angulation and to avoid application of a plaster cast. There is limitation of motion on both sides, due to arthritic changes present before operation, but the patient walks well and has full relief from pain.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COMMENT

It will be appreciated that the method here described relies for its success largely upon the fact that the *lesser trochanter*, as the new point of support, is established at the *physiologic* site of the pelvis, i. e., the acetabulum. Through this new pont of support the weight-bearing thrust is shifted from the dislocated and unstable femoral head to the lesser trochanter and the shaft of the femur. This is demonstrable in postoperative roentgenograms, which show an increased density of the shaft, while the proximal fragment is markedly atrophic.

Significantly, the results are best when the aim of the method, i. e., the adjustment of the lesser trochanter in the acetabulum, is completely achieved. In those cases in which, owing to faulty technic, the lesser trochanter makes contact at some other point of the pelvis, either too high or too low, the results are less satisfactory.

Certainly also the transposition of the point of support toward the midline plays an important role and is one of the reasons of increased stability.

One advantage of the method is that it is not concerned with any eventual deformities of the femoral head or neck (coxa vara, coxa valga, and anteversion), since the head and neck of the femur are practically excluded from weight bearing.

To what extent the *musculature* is implicated in the success of this method is difficult to say. One must, however, assume that lowering of the greater trochanter increases tension on the pelvitrochanteric muscles. This compensates to some degree for their relative insufficiency, enables them to improve their function as pelvic elevators and tends to counteract the Trendelenburg phenomenon.

It must be emphasized that relatively free *mobility* of the hips is retained in the great majority of cases. This is attributable to the round and smooth point of the support and to the fact that the proximal lever of the rotatory system is very short and can therefore easily follow the movements of the leg in any direction. Only adduction is reduced slightly, but this is practically of no importance. As a matter of fact, the postoperative degree of mobility depends entirely upon the preoperative degree of mobility of the femoral head. If the head, as is usually the case in patients with congenital hip dislocation, was freely movable preoperatively, the postoperative mobility should be perfect. If, on the other hand, the femoral head was fixed in a secondary acetabulum by arthritic changes, mobility after the operation will be limited.

Indications.—On the basis of my experience, the following factors would favor the choice of this osteotomy: (1) bilateral involvement; (2) marked displacement that cannot be reduced by any means or cannot be maintained in position without undue tension; (3) deformities of the femoral head and neck, such as coxa vara, coxa valga, and anteversion, and (4) patients who cannot be expected to be sufficiently cooperative to tolerate the extensive procedure of arthroplasty and to perform the necessary exercises after arthroplasty has been carried out.

SUMMARY

Treatment of congenital dislocations of the hip in adults presents a difficult problem. Recent advances in arthroplastic procedures have attempted to cover this type of condition. Satisfactory results were obtained in only a limited number of cases; in others the results were disappointing and equivocal. Even arthroplasty, with shortening of the femoral shaft, has thus far failed to yield successful results.

Obviously, arthroplasty is suitable for old congenital dislocations with minor displacement, in which the femoral head can be brought down with safety to the level of the original acetabulum and can be maintained there without tension or pressure. This means that arthroplasty is reserved for subluxations and supracotyloid dislocations.

For patients with iliac displacement (luxatio supracotyloidea et iliaca and luxa-

tio iliaca) the author's method of subtrochanteric osteotomy, with adjustment of the lesser trochanter in the acetabulum, affords the best promise of success.

The method is also indicated in cases in which the femoral head and neck show extensive deformity.

Twenty-five patients with old congenital dislocations of the hip, ranging from 16 to 46 *years of age, have been treated by* this method. All were followed for more than five years.

It can be stated, on the basis of the author's experience, that this method is not only the simplest and safest procedure but offers the most satisfactory functional results when performed correctly.

RÉSUMÉ

La dislocation congénitale de la hanche de l'adulte présente un problème épineux. La chirurgie orthopédique n'a pas réussi à corriger cette difformité malgré l'arthroplastie, raccourcissement de la tige fémorale. Ce procédé n'a d'usage que pour les vieilles dislocations quand la tête du fémur peut descendre au niveau normal de l'acetabulum et s'y fixer sans tension. Les patients présentant un déplacement de l'iliaque peuvent par le procédé de l'auteur, l'ostéotomie subtrochantérienne avec mise en place du trochanter, trouver un excellent soulagement L'auteur rapporte 25 cas à l'appui suivis depuis 5 ans et plus.

ZUSAMMENFASSUNG

Die Behandlung angeborener Hüftgelenksverrenkungen stellt ein schwieriges Problem dar. Man hat versucht, der Erkrankung durch Ausnützung neuer Fortschritte auf dem Gebiete der Gelenkplastik Herr zu werden. Befriedigende Ergebnisse wurden aber nur in einer begrenzten Zahl von Fällen erzielt; andere wiesen enttäuschende und zweideutige Resultate auf. Sogar die mit Verkürzung des Oberschenkelschaftes verbundene Gelenkplastik hat bisher versagt.

Offenbar eignet sich die Gelenkplastik für Fälle von alten angeborenen Luxationen mit Verlagerungen geringen Grades, wo der Oberschenklkopf mit Sicherheit zum Niveau der ursprünglichen Gelenkpfanne heruntergebracht und dort unter Vermeidung von Druck oder Spannung gehalten werden kann. Mit anderen Worten: die Anwendung der Gelenkplastik bleibt auf Subluxationen und auf supraazetabuläre Verrenkungen beschränkt.

In Fällen mit Verlagerung des Kopfes in die Gegend der Hüftbeinschaufel (Luxatio supracotyloidea et iliaca und Luxatio iliaca) ist die Methode des Verfassers, d. h. die subtrochantäre Osteotomie mit Einpflanzung des kleinen Trochanters in das Azetabulum, das meistversprechende Verfahren.

Dieses eignet sich auch für Kranke mit hochgradigen Entstellungen des Oberschenkelkopfes und—halses.

25 Patienten mit angeborenen Hüftgelenksverrenkungen im Alter von 16 bis 40 Jahren wurden auf diese Weise behandelt und sämtlich für mehr als fünf Jahre weiter beobachtet.

Die Erfahrungen des Verfassers gestatten *die Feststellung, dass sein Methode* nicht nur das einfachste und sicherste Verfahren darstellt, sondern, wenn richtig ausgeführt, auch die meist befriedigenden funktionellen Ergebnisse zeitigt.

RIASSUNTO

Il trattamento della lussazione congenita dell'anca, negli adulti, presenta un difficile problema. Recenti progressi nella tecnica della artroplastica hanno tentato di ovviare a questa condizione. Solo in un numero limitato di casi i risultati furono soddisfacenti; negli altri non si ottenne gran che. Perfino l'artroplastica, con accorviamento della diafisi femorale, è così difettosa, *nella sua tecnica, da non garantire* alcun buon esito.

Ovviamente l'artroplastica è invece indicata nelle lussazioni congenite antiche in cui lo spostamento è minore e la testa del femore può essere rimessa, con sicurezza, nell'acetabolo originale e lì mantenuta senza tensione o pressione. Ciò significa che l'artroplastica è riservata alle forme

di sublussazione e alle forme di lussazione sopracotiloidea.

Nei pazienti con lussazione iliaca (lussazione sopracotiloidea e iliaca e lussazione iliaca) il metodo proposto dagli Autori di osteotomia subtrocanterica con sistemazione del piccolo trocantere nell'acetabolo, è quello che promette i migliori risultati.

Il metodo è anche indicato in quei casi in cui la testa del femore ed il collo presentino deformità gravi.

Con tal metodo sono stati trattati 25 pazienti affetti da lussazione congenita dell'anca, di età variabile dai 16 ai 40 anni. Tutt vennero controllati per più di 5 anni.

Si può quindi stabilire, sulla base delle esperienze compiute dagli Autori che questo metodo è non solo il più semplice ed il più sicuro ma offre anche, se praticato in modo corretto, le migliori garanzie per una soddisfacente ripresa funzionale.

RESUMEN

El tratamiento de las dislocaciones congénitas de la cadera en el adulto presenta un problema difícil. Los adelantos recientes en los procedimientos artroplásticos han tendido a cubrir este tipo de padecimiento. Solamente en un número limitado de casos se obtienen resultados satisfactorios; en otros, los resultados fueron desalentadores y equívocos. Aun la artroplastía con acortamiento de la diáfisis femoral ha fallado.

Obviamente, la arroplastía es adecuada para las dislocaciones congénitas viejas con desplazamientos mínimos, en las cuales la cabeza femoral puede ser llevada hacia abajo con seguridad, al nivel del acetabulum original y puede ser mantenida allí sin tensión ó presión. Este medio artroplástico se reserva para las subluxaciones y dislocaciones supracotiloideas.

En pacientes con desplazamiento ilíaco (luxación supracotíloidea e iliaca y luxación ilíaca), el método del autor de osteotomía substrocantérea, con adjuste del trocánter menor en el acetabulum, ofrece buenas perspectivas de éxito.

El método se encuentra indicado también en los casos en los que la cabeza y cuello femoral muestran una deformidad extensa.

Se han tratado por este método veinticinco pacientes con dislocaciones de la cadera, variando de 16 a 40 años de edad. Todos ellos fueron seguidos por más de cinco años.

Puede establecerse de acuerdo con la experiencia del autor, que este método no solamente es el más sencillo, sino el que ofrece los resultados funcionales más satisfactorios cuando se lleva a cabo correctamente.

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NINTH INTERNATIONAL CONGRESS, 1954

Under the Sponsorship of the Brazilian Government

Notice to All Members of the International College of Surgeons:

The House of Delegates on May 9, 1952, in Madrid, Spain, decided that the City of São Paulo would be the meeting place of the next International Congress, approving the suggestion of His Excellency the Governor of the State, Prof. Dr. Lucas Nogueira Garcez. Brazilian members of the Board of Trustees were appointed to the Commission organizing the Congress, under the direction of Prof. Dr. Carlos Gama, Vice-President of the International Congress and Secretary General for South America.

The Ninth International Congress will be held from April 26 to May 2, 1954. The official topics are (1) experience with socialized medicine in different countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the Fourth Centennial of the city of São Paulo, it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commemorative activities of São Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure that the program shall be absolutely functional, all who are interested are requested to write to the address below.

—Prof. Dr. Carlos Gama, Secretaria, Praca Ramos de Azevedo, 7.°
Andar, Sala 710, São Paulo, Brazil.

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Replacement of the Pericardium

Experimental Work with Vinyon H H Staple in Dogs

JAIME COSTAS-DURIEUX, M.D., A.I.C.S.
PONCE, PUERTO RICO

RUSSELL WELLER, M.D., AND CHARLES P. BAILEY, M.D., F.A.C.S., F.I.C.S.
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THE substitution of grafts for tissues damaged by trauma, disease, or developmental defects has always presented a difficult problem to the surgeon. The production of a great variety of plastics with properties suitable for implantation in the human body has provided one solution to this problem.

Polyethylene, the plastic that has been used most frequently, is employed by the neurosurgeon to fashion skull plates[1] and dura covers;[2] by the orthopedic surgeon for tendon sheaths;[3] by the thoracic surgeon for pleural fill;[4] by the cardiovascular surgeon for blood vessel transplantation;[5] and by the plastic surgeon for facial surgery.[6]

Since pericardial tissue, obtained by resection, is sometimes used to provide autogenous tissue for certain cardioplastic procedures, we have considered ourselves justified in searching for a plastic material to serve as a pericardial substitute. Vinyon cloth is a synthetic material that has already been used successfully to bridge arterial defects.[7] This material was selected for the experiment to be reported.

Materials and Methods.—Vinyon H H Staple is a synthetic fiber spun from a solution of co-polymerized vinyl chloride and vinyl acetate. It is as strong when wet as when dry. The fiber is actually water-repellent. Mold and fungi do not grow on it easily. It softens at temperatures of 125 to 140 F. and melts at 275 to 300 F. It cannot be sterilized, therefore, by boiling or autoclaving.

Sixteen mongrel dogs ranging in weight from 6 to 15 Kg. were used. They were anesthetized intravenously, with nembutal, the dose being 1 cc. per kilogram of body weight. They were intubated and the tube connected to a pneophore respirator. The left hemithorax was entered through the fifth interspace. The lung was retracted posteriorly, and 10 cc. of 1 per cent procaine hydrochloride was injected intrapericardially. The left phrenic nerve was separated from the pericardium and retracted posteriorly. The pericardium on the left side was resected widely, from the great vessels of the heart to the diaphragmatic pleura. A piece of vinyon approximately the same size as the resected pericardium was cut. It was then sutured to the remaining pericardium with continuous or interrupted sutures or both, of No. 000 cotton. The lungs were reexpanded and the chest closed.

Results.—There was only 1 death due to a technical error. The vinyon prosthesis was cut too small and as a result was too tight around the heart. The dog died a short time after closure of the chest because of cardiac tamponade. The 15 that survived were killed at intervals ranging from seven hours to six months after the operation. No pleural or pericardial effusion was observed in any of them. The vinyon on its internal surface had become

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[*] Vinyon H H Staple was obtained from the American Viscose Corporation, Marcus Hook, Pennsylvania.

Submitted for publication Sept. 4, 1953.

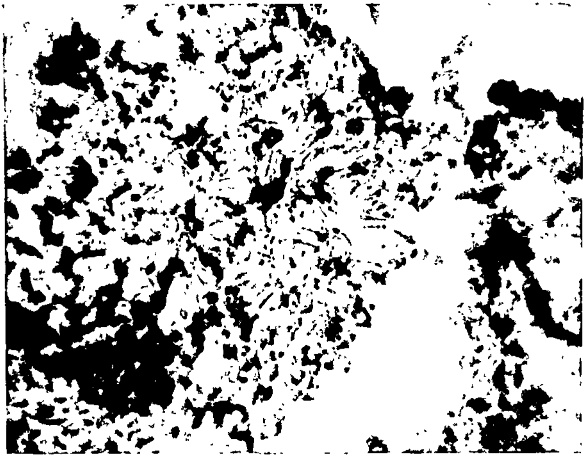

Fig. 1.—Section taken through vinyon graft which was loosely adherent to surrounding structures, showing threadlike strands of vinyon with leukocytic infiltration, some cell débris and occasional strands of fibrin. (Taken twenty-four hours after the operation; x 1000).

adherent to the epicardium, while on the external surface it had been partially covered by pericardial fat and had become adherent to the lung. The adhesions to the lung could not be separated without tearing the latter; however, the adhesions to the epicardium could be separated with relative ease in every instance.

Microscopic Examination.—The grafts from the animals which had been killed were examined microscopically at intervals. The following changes were noted:

Seven Hours: Fibrinopurulent pericarditis was present, with focal fat necrosis of the epicardium adjacent to the vinyon. The strands of vinyon were plainly visible.

Twenty-Four Hours: The picture was essentially the same as that at seven hours, although there appeared to be more polymorphonuclear neutrophils and less fibrin on the pericardium. The vinyon was easily identified.

One Week: Atelectasis of the lung was present, and this organ had become adherent to the epicardium. An abundance of granulation tissue was present in the areas of adhesion. Although the vinyon fibers were present, they were not so obvious as they had been previously. A moderate degree of coronary arteriosclerosis was also noted in this animal.

Two Weeks: At this time there was less inflammatory reaction in the fat. Around the great vessels, however, a few phagocytes and some cellular fibrous tissue were noted. The vinyon fibers were present, with much less reaction, and blended in some areas with fat and connective tissue, thus becoming difficult to identify.

Three Weeks: An atelectatic lung again was adherent to the epicardium, with slightly less granulation tissue than had been seen previously, and there were some foreign body giant cells. Again, the vinyon merged with necrotic and viable fat, making identification at times difficult.

One Month: The sections showed es. tially the same changes as those not three weeks.

Two Months

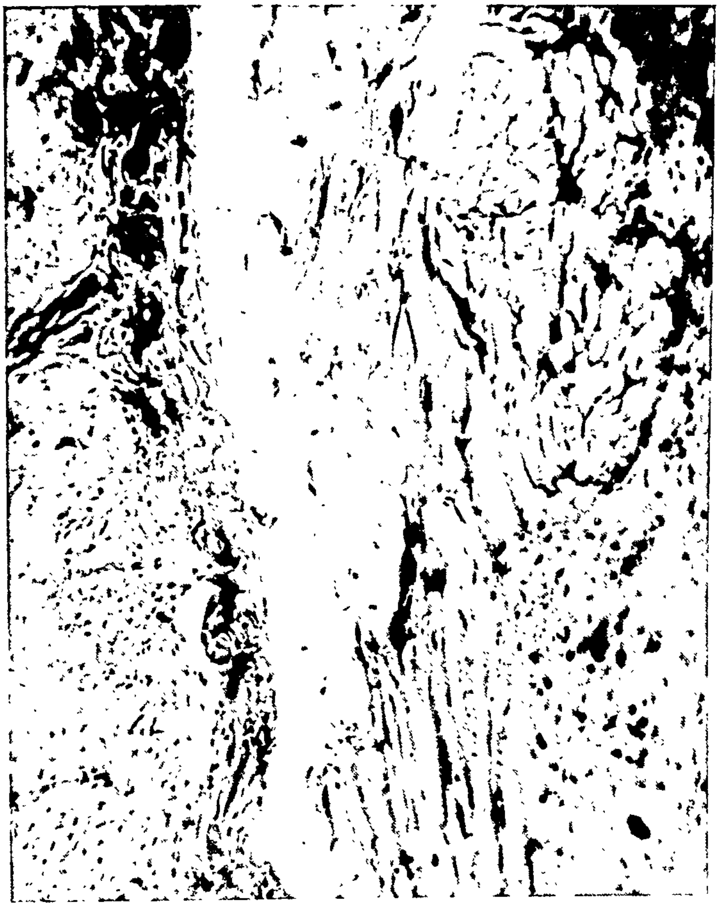

Fig. 2.—The picture at one week has changed, with proliferation of granulation tissue surrounding the vinyon fibers.

was decreased, and more mature fibrous tissue was present.

Six Months: A large amount of hyalinized fibrous tissue was seen, but focal foreign body reaction and abscesses were present in the epicardial area. Vinyon fibers were seen with difficulty in the foreign body granulomas and were visualized best with polarized light.

COMMENT

The tissue reaction to the vinyon pericardial graft (beginning at seven hours and extending through six months) consisted first (at seven hours) in the production of a fibrinopurulent type of exudate surrounding the graft material, which changed in approximately one week by a process of organization, resulting in abundant granulation tissue adhesions and atelectasis of lung tissue, which became adherent to the pericardium. The adhesions remained throughout the course of the microscopic studies. After two weeks the inflammatory reaction began to subside and a more mature type of fibrous tissue was seen. At this time phagocytes and foreign body giant cells became more numerous than before. In three to four weeks the fibrous tissue became definitely more mature, with much less granulation tissue, and at six months large amounts of hyalinized fibrous tissue were present, but even at this age foci of collections of foreign body giant cells were noted and an occasional abscess, apparently of a sterile type, was seen. The vinyon fibers at this age appeared to have undergone some degenerative change, so that they

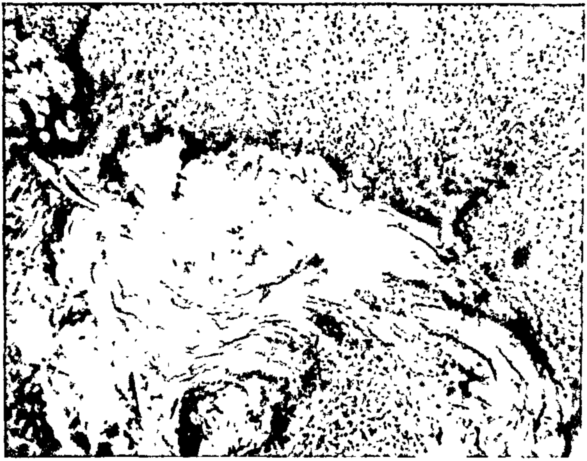

Fig. 3.—At two weeks, the inflammatory reaction in the granulation tissue has subsided to a marked extent, with proliferation of more mature fibrous connective tissue. Vinyon fibers are visible in the middle lower portion of the picture, while in the upper right portion epicardial fat can be noted.

were identified microscopically with some difficulty. This difficulty, however, could be overcome easily by the use of polarized light.

SUMMARY

Vinyon, a co-polymer of vinyl chloride and vinyl acetate, appears to be well tolerated by living tissues. It has been used as a pericardial substitute in a series of dogs. At intervals during a period beginning at seven hours and ending at six months, its reaction in the tissues was observed and was definitely shown to be benign.

RÉSUMÉ

Le Vinyon semble bien toléré par les tissus. Son usage a été expérimenté chez les chiens pour une période de temps variant de 7 heures à six mois.

ZUSAMMENFASSUNG

Vinyon, eine co-polymere Verbindung von salzsaurem und essigsaurem Vinyl, wird vom lebenden Gewebe offenbar gut vertragen. Es ist an einer Reihe von Hunden als Herzbeutelersatz angewandt worden. Seine Reaktion auf das Gewebe wurde in gewissen Zeitabständen innerhalb eines Zeitraums von sieben Stunden bis sechs Monate nach der Operation beobachtet und erwies sich mit Bestimmtheit als harmlos.

RESUMEN

El Vinión, un coäpolímero del cloruro vinílico y el acetato vinílico, parece ser bien tolerado por los tejidos vivientes. Ha sido usado como un substituto del pericardio en una serie de perros. Durante un *período que empieza a las siete horas y* termina a los seis meses, se observó reacción tisular y fué definitivamente benigna.

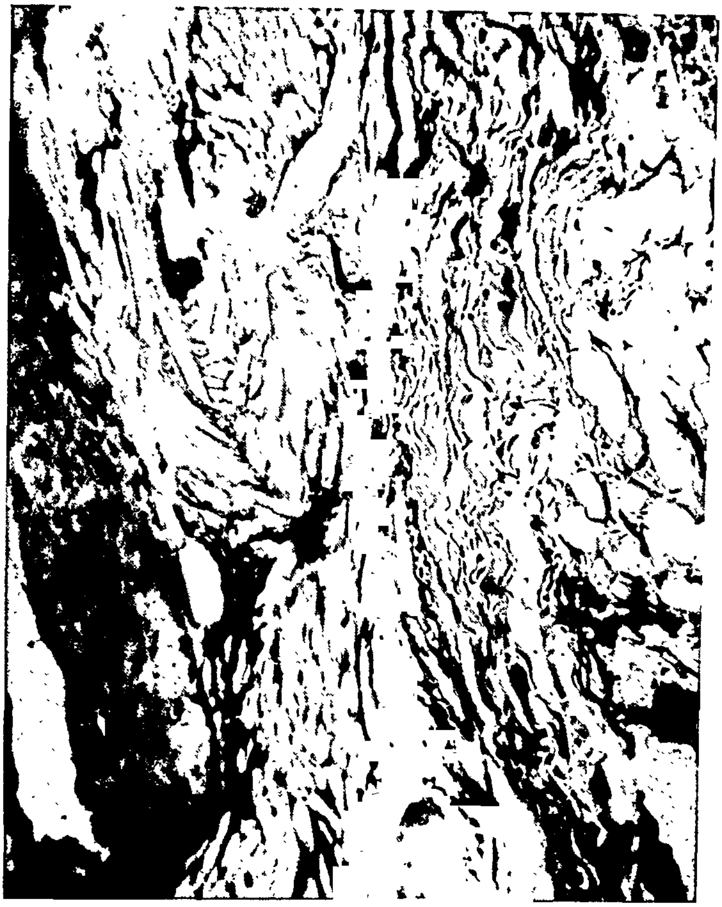

Fig. 4.—At six months, the vinyon is seen in the left upper middle and lower portions of the picture, together with myocardium to the left, and to the right are dense bands of hyalinized connective tissue and subepicardial fat x 100.

RIASSUNTO

Il Vinyon, un polimero del cloruro e dell'acetato di vinile, è ben tollerato dai tessuti. E' stato usato in luogo del pericardio in una series di cavie; le reazioni provocate nei tessuti furono osservate durante periodi da 7 ore a 6 mesi e furono trovate decisamente benigne.

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Acute Mesenteric Arterial Occlusion: Restoration of Blood Flow by Embolectomy

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UNRELIEVED occlusion of the main stem of the superior mesenteric artery ultimately leads to gangrene of a major portion of the bowel. This portion consists of all the jejunum and ileum (with the exception of the proximal 18 inches [45.7 cm.] of jejunum) and the proximal half of the large bowel (Fig. 1*A*).

Up to the present time the universal surgical teaching has been that gangrene must be accepted as inevitable in all cases of such occlusion and that the only surgical treatment is resection of this very large segment of the intestinal tract. The result is far from satisfactory. Patients who have withstood this heroic procedure are rare enough to exist as surgical curiosities. Meyer[1] and Musgrove[2] have reported 2 such cases. Ficarra[3] stated that 554 cases had been reported up to 1944, in only 32 of which resection was successful—a mortality rate of 94 per cent.

Although the removal of intra-arterial obstructions with successful reestablishment of blood flow is an accepted basis of vascular surgery, this procedure has not been generally attempted in cases of occlusion of the superior mesenteric artery. Possibly this is the price of surgical specialization. Vascular surgeons are not called to an "acute abdominal emergency," and abdominal surgeons are not vascular surgeons, either by training or by outlook.

Before change can be accepted from the current procedure of massive bowel resection toward removal of the obstructing element within the superior mesenteric artery, certain fundamental questions need to be answered.

First, can the circulation in the superior mesenteric artery and its branches be restored by removal of the obstructing thrombus?

Second, can the viability of the bowel wall be maintained by the procedure?

Third, since there must be a point in time at which irreversible cellular changes take place (in spite of the restoration of arterial flow), what is the critical period within which this procedure is likely to succeed?

Two cases in which embolectomy was performed, both ending in postmortem examination*, are here presented as an attempt to find answers to these questions. The problem of whether the obstructing element within the vessel is a true embolus, cast down from elsewhere, or a thrombus formed *in situ* is not pertinent to this presentation and unimportant to immediate surgical treatment. The term "embolectomy" is here used to indicate the surgical removal of an obstructing intra-arterial plug, whatever its source may be.

REPORT OF CASES

CASE 1.—This case, previously reported in detail,[4] was that of an actively employed carpenter aged 64 with a compensated auricular fibrillation. He was first seen by my colleague Dr. E. H. Brotman two hours after the onset of symptoms pointing to an acute abdominal catastrophe and correctly diagnosed as occlusion of the superior mesenteric artery. Operation fourteen hours after the onset revealed no flow of blood in the superior mesenteric artery or in any of its tributaries. This was proved by an incision into a bloodless vessel 2 cm. distal to its origin from the aorta. The

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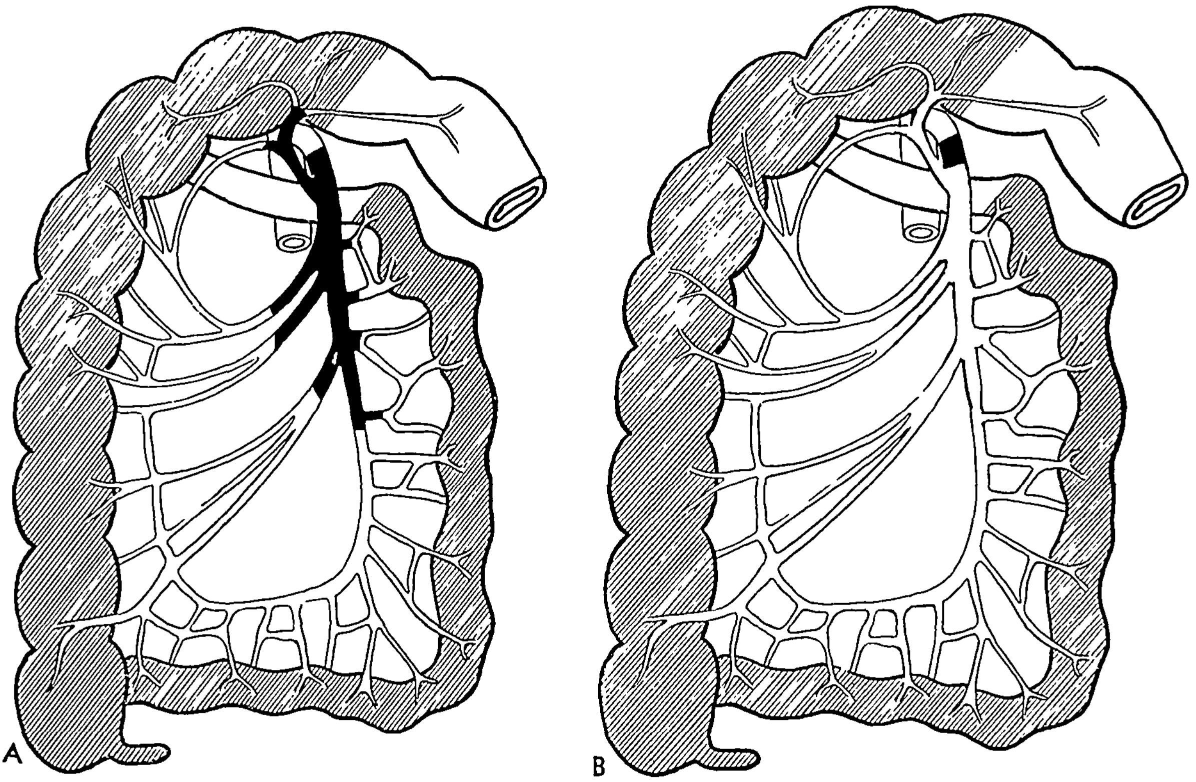

Fig. 1.—*A*, preoperative condition in Case 1. Dense black area represents part of main stem and branches of superior mesenteric artery occluded by the obstructing agent; shaded area, portion of vessel deprived of actual blood. *B*, preoperative condition in Case 2. Obstructing element much smaller than in Case 1, but same portion of bowel affected. No evidence of collateral flow, despite the fact that no main branch of artery (superior mesenteric) was occupied by clot.

obstructing mass was located just at the incision, and a plug about 6 cm. long was removed (Fig. 1*A*). An immediate gush of blood indicated that the obstruction was relieved. The opening in the vessel was closed. Postoperative management included the administration of papaverine and heparin.

Bowel sounds were active twenty-four hours after the operation, and the patient had a normal bowel movement at forty-eight hours. Twelve hours after this hopeful event, acute myocardial failure developed, with pulmonary edema, and he died.

Autopsy revealed that the immediate cause of death was the acute pulmonary edema resulting from myocardial failure. It was established, however, that the bowel was viable—an important point. The bowel wall at no area showed any gangrenous ulcerative changes. Dissection of the superior mesenteric artery and its branches revealed that the sutured area was healing normally and that no occlusion now existed at this point or in any other portion of the vessel.

CASE 2.—The patient, a woman aged 67, was under outpatient care for auricular fibrillation and diabetes mellitus. She was first seen eight hours after the sudden onset of symptoms resulting from an occlusion of the superior mesenteric artery, and her condition was correctly diagnosed by the surgical resident, Dr. William McLean. Operation twelve hours after the beginning of symptoms revealed obstruction of the main stem of the superior mesenteric artery (Fig. 1*B*). An incision into the artery 3 cm. below its point of origin opened into an empty vessel. An obstructing plug about 2 cm. long (Fig. 2) was removed from the interior of the vessel just proximal to the incision, and a brisk flow of blood immediately followed. The vessel was sutured, and the patient returned to bed.

Postoperative treatment included control of the diabetes plus the administration of heparin. During the first twenty-four hours the patient was given a total of 23,000 units of

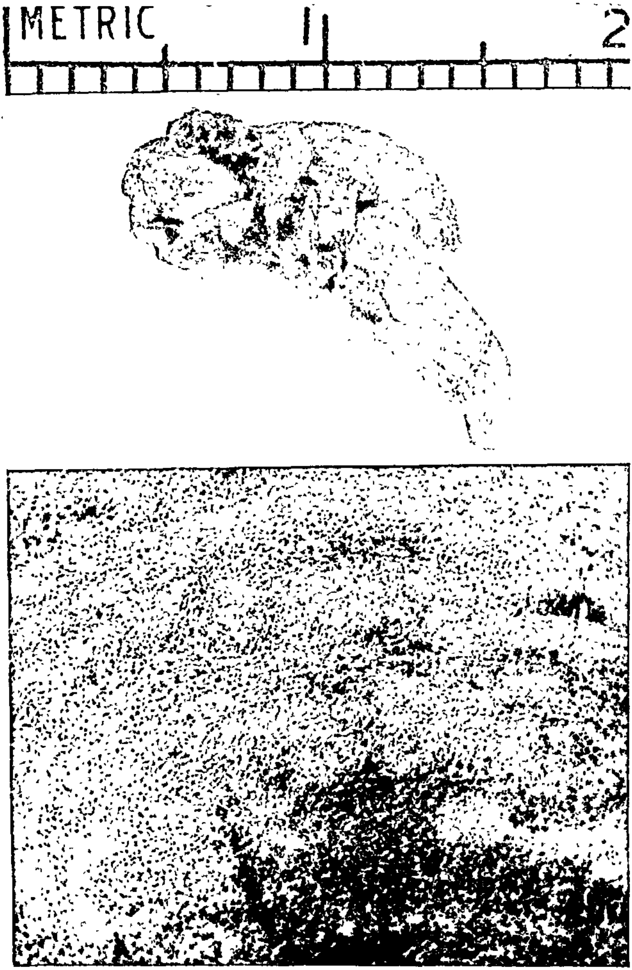

Fig. 2.—Gross and microscopic photographs of specimen removed in Case 2. The microscopic view (×50) reveals a typical laminated antemortem thrombus.

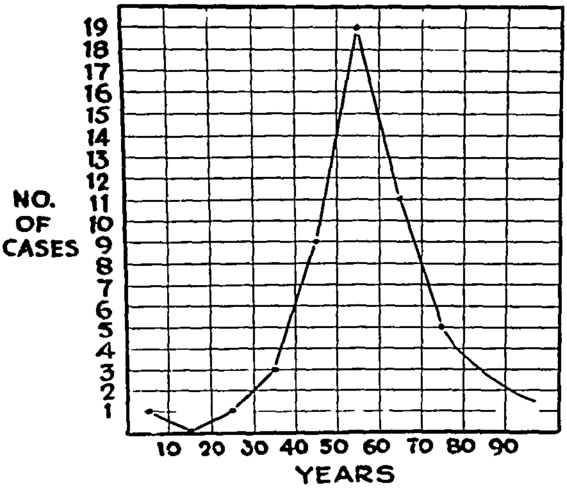

Fig. 3.—Chart of age groups involved. The diagnosis of acute mesenteric occlusion is fairly sharply confined to an age group beyond 50 suffering from known cardiovascular disease. As to predisposing factors, in a total of 60 cases cardiovascular disease was a factor in 52 and postoperative complications in 7. In the remaining case no data are available (After Johnson and Bagenstass[5]).

heparin, and at the end of the first postoperative day the clotting time was just over one hour. Eighteen hours after the operation, active bowel sounds could be easily heard, and her general condition appeared satisfactory. Forty-eight hours after the operation she showed increasing pallor and weakness; her blood pressure began to drop, and she died fifty-six hours after the operation.

Postmortem examination revealed that death was due to massive intraperitoneal hemorrhage (about 4,000 cc. of unclotted blood), complicated by recent bleeding into the lower left bronchus, with atelectasis of the corresponding part of the lung. Examination of the superior mesenteric artery and its branches showed that the incised portion was secure against leakage and was healing normally and that no obstruction was present in either the main stem of the artery or any of its tributaries. The bowel wall was entirely normal. Nowhere was there any discoloration, nor did the mucosa show any evidence of necrosis or ulceration. Gross and microscopic studies of the liver showed no evidence of hepatitis.

The fatal postoperative intraperitoneal hemorrhage had come from mesenteric veins that had been cut in the dissection necessary to expose the superior mesenteric artery during the operation.

COMMENT

If one can accept each procedure a detached scientific attitude, as a tempt to reestablish blood flow in a viously obstructed artery, both opera were successful in this unhappily li sense. In each case postmortem st revealed that the bowel was normal a a condition consistent with survival the first case the bowel had been t deprived of blood supply for fou hours; in the second case, for twelve h In both cases the superior mesen artery and its branches remained p after removal of the obstructing lesi

Death in Case 1 was due to myoca failure and in all probability was una able.

In Case 2, on the other hand, death due to massive intraperitoneal he rhage, was probably avoidable, and mands critical review. Two factors ably caused the lethal hemorrhage:

1. Exposure of the superior mesen artery was made by dissecting thr the mesentery of the small bowel unti right colic branch was isolated and along this vessel through the fatty t of the root of the mesentery until th perior mesenteric artery was cleare to its point of emergence from the a Numerous veins and smaller mesen arterioles were inevitably cut across ing this dissection. It was, however, sufficiently appreciated at the time of section that these veins and lesser arte by reason of the occlusion of the pa trunk, were bloodless. No special e was made, in anticipation of a rest local circulation, to insure that the e area of dissection was rendered se against hemorrhage. This technical was without doubt mainly responsib the lethal hemorrhage.

2. Heparin was used in four hour jections, and a total of 47,000 units administered in the entire postoper period of fifty-six hours. At one o tests, the clotting time was in exce one hour. There is no doubt that the mal tendency of veins and arterioles

natural arrest of hemorrhage by clotting was viciated by the use of heparin. Continued intraperitoneal bleeding and terminal intrabronchial hemorrhage were the results.

Practical Considerations.—If embolectomy is ever to be performed successfully in the presence of occlusion of the main stem of the superior mesenteric artery, certain basic requirements must be fulfilled. Of these the most important is early diagnosis. There is no doubt that the fourteen-hour period of arrested flow must be close to the "point of no return" and cannot be exceeded with safety.

The early diagnosis is dependent on awareness of the clear-cut syndrome that indicates mesenteric vascular occlusion. A review of several postmortem series by Johnson and Bagenstoss[5] indicates that in 52 of 60 cases (87 per cent) the condition occurred in patients with obvious preexisting cardiovascular disease and that in a further 7 of the 60 (11 per cent) it was a catastrophe occurring in the immediate period following various operations. Thus, if these two groups are combined, namely, the patients with cardiovascular disease and the patients in whom occlusion developed postoperatively, about 98 per cent of cases of mesenteric arterial occlusion are defined. To narrow the area of diagnosis further, there is a sharply limited age incidence, with a very sharp rise after the age of 50 (Fig. 3). If these two factors—preexistent cardiovascular disease and age incidence—are coupled, the early diagnosis should not present great difficulty.

The clinical factors are also clearly outlined. The onset of symptoms is sudden and dominated by severe abdominal pain and collapse. If within the next few hours there are loose, small, bloody bowel movements, diagnosis can be made with cer-

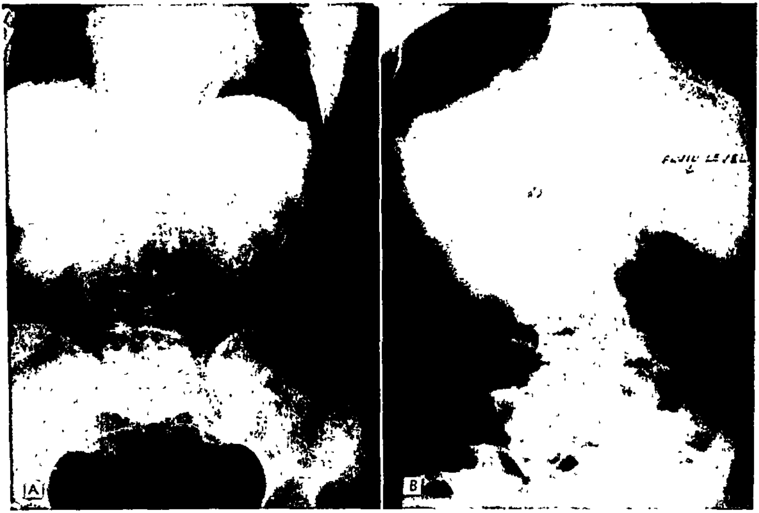

Fig. 4.—A, an early flat abdom[illegible] mesenteric arterial occlusion (Case 2), showing no deviation f[illegible] in a case of late mesenteric arterial occlusion. The marked [illegible] ations of [illegible] ible gangrene of the bowel.

tainty.

There are, however certain, pitfalls in the early stages. Abdominal examination is almost completely disarming. The abdominal wall is not tense but often doughy and soft; tenderness is moderate and diffuse, and there is no distention.

A flat roentgenogram of the abdomen is read by competent roentgenologists as "negative." I have suspected that the early films show less than the "normal" amount of gas in the small bowel (Fig. *4A*) and seem to have a "ground glass" appearance, but these are points difficult to prove. Suffice it to say that in the early stages the "scout film" of the abdomen is read as "negative." It is only in the later prelethal stages of irreversible bowel changes leading to gangrene that distention and a ladder pattern are seen in the coils of the small bowel (Fig. *4B*).

It is important to emphasize these early observations. In these days of frequent, nearly routine, use of intestinal intubation for almost all conditions labeled as "intestinal obstruction" the victim of mesenteric obstruction can be easily carried past the few critical hours of reversible bowel changes to the stage of inevitable gangrene.

A further point deserving emphasis is that when the peritoneal cavity is entered in the early stage of main stem occlusion the bowel looks deceptively normal. The color is not far removed from what is natural. It is not blue or particularly cyanosed. In some cases it may be "off pink," but no more so than when the anesthetist is having difficulty with an inadequate airway. Furthermore, there is no distention whatever. Slight automatic movement of the bowel wall may be seen—not enough to constitute a definite peristaltic wave but representing rather incoordinate segmental contractions of smooth muscle. These observations should be accepted as entirely consistent with early complete superior mesenteric arterial occlusion, and if no pulsations can be felt in the mesentery, in the presence of a definite clinical history, the right colic artery should be exposed without *hesitation and traced to the superior mesenteric artery*, where proof of the diagnosis will finally rest.

CONCLUSIONS

From observations made in the 2 cases here reported it seems reasonable to draw the following conclusions:

1. Circulation in the superior mesenteric artery and its branches can be restored by removal of an obstructing thrombus.
2. Circulation within the bowel wall *compatible with continuing viability* can be assured by this procedure.
3. The bowel wall can survive total deprivation of blood for a period of fourteen hours. Nothing can be said with reference to survival beyond this time limit, but parallel experience with muscle tissue generally would indicate that it cannot safely be exceeded.
4. During the operation, particular care should be taken to secure arrest of hemorrhage, which may occur only after restoration of mesenteric blood flow. This applies in particular to the dissection of mesenteric fat that is necessary to expose the superior mesenteric artery.
5. The postoperative use of heparin should be avoided. Sufficient reliance can be placed on flow velocity in an artery to prevent reformation of a thrombus at the site of the incision into the vessel.

Author's Note: I am indebted to Dr. John Gemmell and his staff for control of the diabetic state both before and after operation in Case 2.

The postmortem studies and microscopic sections of surgical specimens in both cases were performed by the staff of Dr. Daniel Nicholson, pathologist to the Winnipeg General Hospital and Professor of Pathology, University of Manitoba.

*Since this article was written I have had the following communication from Dr. Edward K. Connors of Omaha, Nebraska. Dr. Connors writes:

"Approximately three months ago I performed a similar procedure on a patient at the Veterans Hospital. At the time I performed this procedure I was not aware that it had been done before until I came across your article afterward in the Annals of Surgery.

"The case I operated on likewise showed viability of the first eighteen inches of jejunum, which led me to suspect an embolus in the superior mesenteric artery had occurred, rather than a thrombosis. The findings in the case I operated on were similar to yours and unfortunately my patient also expired about two days postoperatively from pulmonary edema. At autopsy there was no evidence of gangrene of the bowel. The superior mesenteric artery had remained patent. The procedure seemed perfectly logical to perform in view of the finding of viability of the first portion of the small bowel."

RÉSUMÉ

D'après les deux observations ici rapportées, l'auteur en arrive aux conclusions suivantes: à savoir qu'on peut rétablir la circulation dans la mésentérique supérieure et ses branches en enlevant le thrombus qui obstrue cette artére et de la sorte rétablir la circulation dans la paroi intestinale. L'intestin peut supporter une ischémie pour 14 heures; plus que cela, on ne peut répondre des conséquences. Pendant l'intervention, il faut prendre les précautions nécessaires pour faire une héhorragie secondaire à la dissection obligatoire. L'heparine est contre-indiquée post-opératoire.

CONCLUSIONI

Dalle osservazioni fatte sui 2 casi qui riportati vengono tratte le seguenti conclusioni:

1. Si può ristabilire la circolazione nell'arteria mesenterica superiore e nelle sue branche, rimuovendo un trombo occludente.
2. Mediante tale procedimento viene assicurata la circolazione nella parete intestinale.
3. La parete intestinale può sopravvivere per 14 ore alla totale mancanza di apporto sanguigno. Non si può con sicurezza stabilire la sopravvivenza oltre tale limite, ma esperienze parallele condotte sul tessuto muscolare dimostrano che esso non può essere impunemente sorpassato.
4. Durante l'operazione occorre porre particolare attenzione onde assicurare l'arresto di un emorragia, che può verificarsi solo dopo che il flusso sanguigno nella mesenterica è ristabilito. Tale eventualità si ha sopratutto al momento in cui viene asportato il grasso mesenterico, procedimento necessario per la messa in evidenza dell'arteria mesenterica superiore.
5. E' da evitarsi l'uso, postoperatorio, dell'eparina. La velocità stessa del flusso sanguigno in un arteria è sufficiente garanzia a prevenire il riformarsi del trombo nel luogo di incisione nel vaso.

CONCLUSIONES

A partir de observaciones hechas en 2 casos aquí comunicados, parece razonable derivar las conlusiones siguientes:

1. La circulación de la arteria mesentérica superior y sus ramas puede ser restituída por la extirpación de un trombo obstructivo.
2. La circulación de la pared intestinal compatible con la viabilidad puede asegurarse por este procedimiento.
3. La pared intestinal puede sobrevivir a la ausencia de sangre por un período de catorce horas. No puede decirse nada con referencia a la sobrevida másallá de este límite de tiempo, pero experiencias comparables con tejido muscular indican, generalmente, que no puede ser excedido inocuamente.
4. Durante la operación debe tenerse especial cuidado en asegurar la hemostasis de la hemorragia que puede ocurrir únicamente después de la restauración del aflujo sanguíneo mesentérico. Esto se aplica particularmente en la disección de la grasa mesentérica, que es necesaria para exponer la arteri mesentérica superior.
5. Debe evitarse el uso postoperatorio de heparina. Suficiente confianza puede ponerse en la velociad de circulación sanguínea de una arteria para prevenir la reformación de el trombo en el sitio de la incisión en al interior del vaso.

SCHLUSSFOLGERUNGEN

Beobachtungen an zwei hier berichteten Fällen scheinen zu folgenden Schlussfolgerungen zu berechtigen:

1. Der unterbrochene Blutkreislauf in der oberen Mesenterialschlagader und ihren Asten kann durch Entfernung des verstopfenden Thrombus wieder in Gang gebracht werden.
2. Es kann auf diese Weise

Erhaltung der Lebensfähigkeit der Darmwand ausreichende Blutzufuhr sichergestellt werden.

3. Die Darmwand ist fähig, eine vierzehnstündige völlige Absperrung der Blutzufuhr zu überleben. Ob sie eine längere Unterbrechung ertragen kann, lässt sich nicht sagen; ähnliche Beobachtungen an Muskelgewebe scheinen aber allgemein anzudeuten, dass die oben angegebene Grenze wohl nicht ohne Gefahr überschritten werden kann.

4. Während der Operation ist besondere Sorgfalt auf die Stillung von Blutungen zu verwenden, die nach Wiederherstellung des mesenterialen Blutkreislaufes auftreten können. Das gilt besonders für die zur Freilegung der oberen Mesenterialschlagadern notwendigen Präparierung des Mesenterialfettes.

5. Verabreichung von Heparin nach der Operation soll vermieden werden. Die arterielle Strömungsgeschwindigkeit bietet genügend Gewähr für die Verhütung neuer Thrombenbildung an der Einschnittsstelle des Gefässus.

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To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the **Journal** to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the **Seccion en Espanol**, which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language. Prompt publication can be greatly facilitated if all manuscripts are typed in double or triple space to allow room for editorial corrections. Your cooperation will be deeply appreciated.

The Enzymatic Débridement of Suppurations, Necrotic Lesions and Burns with Papain

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AND

MARIA GABRIELA STEIN DE GUZMAN, B.A., M.D.

SAN JOSÉ, COSTA RICA

THE use of enzymes in the treatment of suppurations, necrotic lesions and burns involving the body surfaces is not new and has been tried in the past, but it was not until streptokinase and streptodornase[1] were isolated and studied that a thorough consideration was given to their full value as fibrinolytic agents. Many reports have appeared in the literature on the excellent results obtained with these two enzymes.[2]

To us, in this part of the world, there is one objection to the use of streptokinase and streptodornase or any other fibrinolytic enzyme already on the market—the cost to the hospital or to the patient and the fact that the majority of patients who require this treatment cannot afford it. It is for this reason that we have tried to find a less expensive but equally effective enzyme with a proteolytic action. We have at last been successful and have obtained excellent results with the enzyme selected, which is papain, the dried milky juice of the melon tree *carica papaya*. It is a yellowish, grayish or light brown powder with a characteristic odor. It is soluble in water and glycerine and insoluble in alcohol, ether and chloroform. As regards its effect on proteins, it is said to be especially activated by hydrogen sulphide and sulphydryl compounds in general, as well as by hydrogen cyanide.[3] It is also activated by sulphur containing such amino acids as cysteine and methionine. Glutathione also activates it.

Methods of Study.—We have employed in our work several brands of papain from the market. First of all, the proteolytic activity of the enzyme *in vitro* was assayed by the usual procedure, carried out on a protein substance at plus-minus 37 C. Great variation was noted in their activity, the proteolytic power of the various brands ranging from almost nil to a high level. Enzyme activators were not employed, nor did we try to purify the solutions,—to adjust the solutions or the substrate to any hydrogen ion concentration or to render the powder sterile.

Two methods have been followed in the treatment: (1) the application of wet dressings with freshly prepared solutions of the enzyme, ranging from 2 to 5 per cent, and (2) direct application of the powder with a common vaginal insufflator. With the first method, surgical gauze in several layers was soaked with the solution of papain and placed over the affected part, covering it completely. With the second method, the surface to be treated, if dry, was first sprayed with sterile physiologic solution of sodium chloride and then with papain, an abundant coating being left on thick crusts. The surface was then covered with several layers of surgical gauze well soaked with physiologic solution of sodium chloride. Finally, with either method, a layer of petrolatum gauze was applied, the edges being carefully sealed so that no solution could come out. A final dry bandage was used. The dressings were changed every twenty-four hours and the lesions inspected and cleansed with physiologic solution of sodi-

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Results of Treatment of Twenty Patients with Papain

Case	Age of Patient	Type & Site of Lesion	Area, Sq. Cm.	Antibiotics Employed	Form of Papain Employed	Treatment, Hours	Percentage of Debridement 24 Hr.	48 Hr.	72 Hr.	96 Hr.	120 Hr.
1	10	Dry, hard, noninfected crust of leg	24	None	3% solution	24	100				
2	10	Chronic suppurated amputation stump, slough	15	None	2% solution & powder	48	90	100			
3	1	Gangrenous cellulitis of abdominal wall, slough	36	Penicillin Aureomycin	3% solution	48	90	100	75	95	100
4	52	Deep carbuncle of neck with thick pus & slough	49	Penicillin	Powder	120		50			
5	70	Chronic infected leg ulcer, false granulation and thick crusts	70	Penicillin	2% solution	72	50	75	100		
6*	44	Large chronic infected leg ulcer, thick crust around false granulation	200	Penicillin	Powder	96		100			
7	56	Chronic, large, deep, foul infected leg ulcer with lymphedema of foot	150	Penicillin	Powder	72	75	90	100		
8	65	Chronic infected leg ulcer	36	Penicillin	2% solution	48	90	100			
9	1	2d degree burn, dry noninfected crust on chest, abdomen and arm	600	Penicillin	Powder	48	95	100			
10	4	2d degree burn of thigh and abdomen with false granulation and crusts	85	Penicillin	Powder	48	80	100			
11	21	2d degree burn of thighs and abdomen, heavily infected	360	None	3% solution	24	100				
12	4	2d degree burn with dry crusts	20	None	5% solution	24	100				
13	6	2d degree infected burn of feet and ankles	200	Penicillin	Powder	48	85	100			
14	3	2d degree burn of face, neck and thorax	100	Penicillin	Powder	24	100				
15**	13	3d degree burn of shoulder and arm	160	Penicillin	Powder	48	75	90			
16	6	3d degree burn of neck, right arm & forearm with purulent crusts	250	Penicillin	Powder	48	80	100			

17	30	3d degree burn of thorax and arm with infected crusts	300	Penicillin	2% solution	24	100				
18†	10	2d & 3d degree burn of chest and abdomen with leathery hard crusts	1200	Penicillin	Powder	120	75	80	95	95	100
19	12	3d degree burn of neck and chest with infected crusts	....	Penicillin Streptomycin	5% solution	24	100				
20	15	3d degree burn, with thick infected crusts & false granulation on thighs, legs & feet	1500	None	3% solution	48	85	100			

*The large area of false granulation with purulent foul exudate was clean in 24 hours, but not so the thick adherent peripheral crust, which was not digested at all, though it separated easily from underlying tissues, leaving the ulcer completely clean and ready for grafting one week later.

**Two areas were treated at the same time in this case, one with papain, the other with streptokinase-streptodornase. Results after 24 hours were similar.

†About 75% of area treated was clean in 24 hours. The remaining 25% consisted of very thick, dry, black leathery crust that was not digested entirely but was softened and its color turned to yellow. It was easily detached after the fourth treatment.

um chloride. Papain was reapplied if necessary.

Three patients in whose cases it was possible to select control areas were treated with a solution of streptokinase-streptodornase and the results compared with those of papain at the end of twenty-four hours. Color photographs were taken of all lesions before and after their treatment with papain. About half of the patients were being given antibiotics parenterally at the same time.

Results.—The lesions have been divided into seven groups: (1) second and third degree burns, mostly infected; (2) gangrenous cellulitis of the abdominal wall; (3) carbuncle of the neck; (4) chronic leg ulcers; (5) chronic open suppurations, and (6) hard noninfected crusts. Prior to treatment, all lesions have been measured to determine their surface extent in square centimeters and their approximate depth in millimeters. The results of treatment were measured every twenty-four hours in terms of percentage of completely débrided area (lesion clean of pus, crusts or slough as far down as healthy tissue). Good enzymatic activity was considered established by the appearance of a completely digested substrate which had lost its solid constitution and acquired the consistency of creamy pus, which is usually absorbed by the gauze. The accompanying table shows the results of enzymatic débridement with papain in 20 cases.

The enzymatic action of papain was optimal or exceptionally good on areas covered by solidified fibrinous exudates and purulent and necrotic processes. It was poor or slow on thick, leathery hard crusts as of the type sometimes observed on third degree burns. These crusts were not liquefied but only softened. We learned also that incision or perforation helped to soften or detach the crusts. As other authors[4] have also noted with streptokinase-streptodornase, papain also seems to act better when there is a "serum factor," as in purulent areas, or when there is an exudate that keeps the lesion wet. Five per cent solutions of papain seem to have a more potent or homogene-

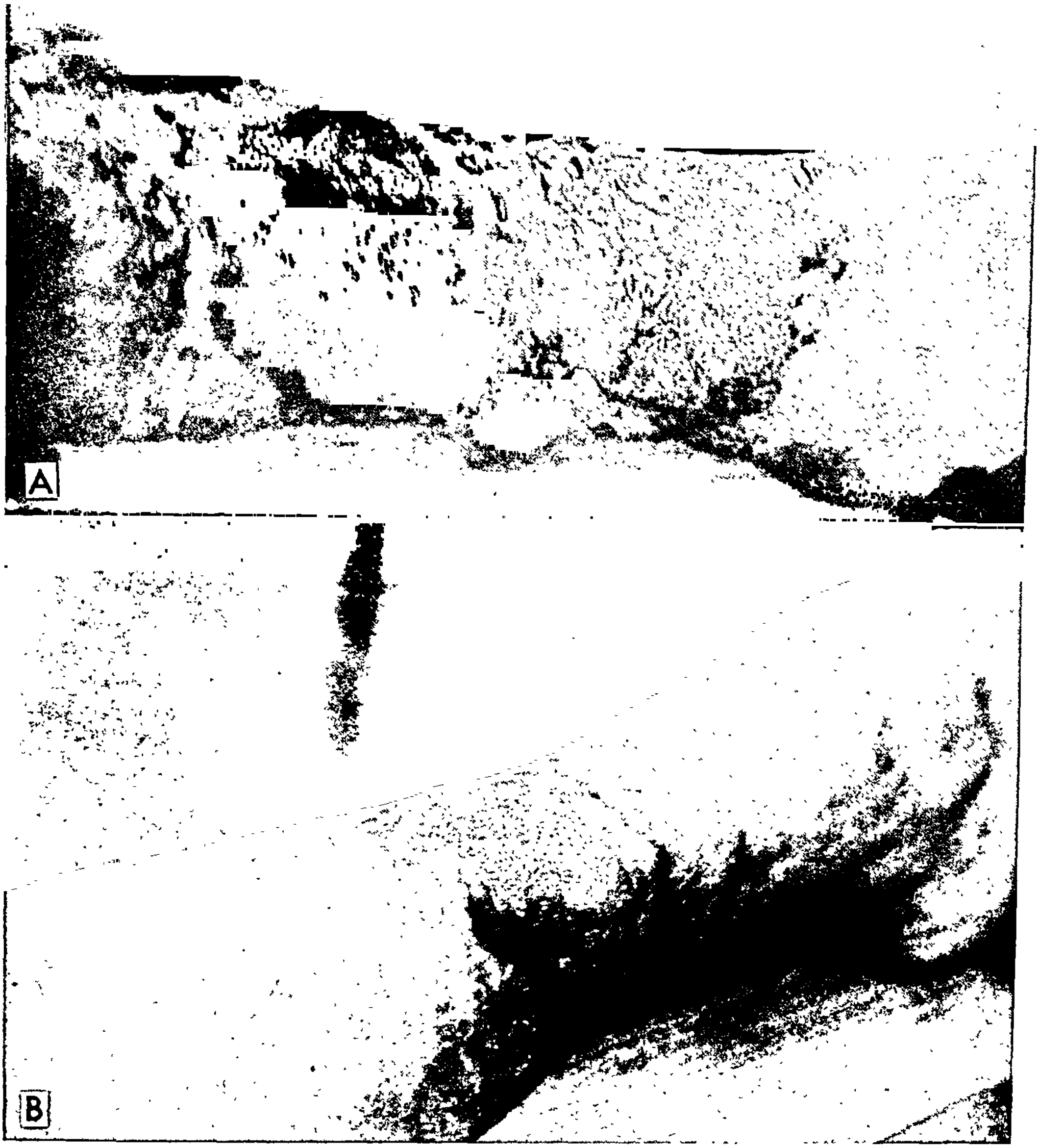

Fig. 1. (Case 6).—*A*, large infected chronic leg ulcer with thick crust around false granulation. *B*, same ulcer after forty-eight hours' treatment with papain.

ous action than the powder, but the latter is equally effective, or more so, when sprayed on a wet area which is in turn covered with wet dressings and petrolatum gauze. Treated areas should not be uncovered for twenty-four hours. Most of the lesions treated by us, especially burns, were débrided completely in this minimum time. Petrolatum gauze applied to the clean débrided area is most helpful in preventing the formation of a new fibrinous crust, and grafting may be tried in the majority of cases in from three to seven days after the last treatment. Papain has had no deleterious action on healthy tissues, and systemic reactions have not been observed during its application.

CONCLUSIONS

The fibrinolytic enzyme papain is suggested as an effective and potent agent of débridement in the treatment of chronic suppurative and nectrotic areas. It has been used in the treatment of 20 patients with various lesions, including second and third degree burns, chronic leg ulcers, gangrene, carbuncle, chronic suppuration and dry crusts.

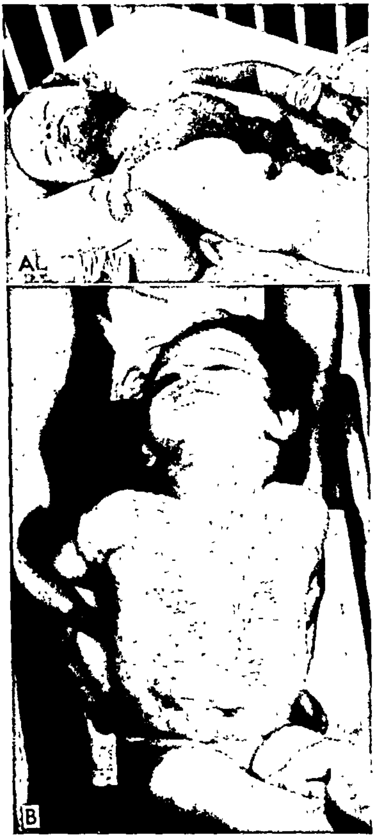

Fig. 2 (Case 9).—*A*, second degree burn with dry, noninfected crust on chest, abdomen and arm. *B*, same patient after forty-eight hours' treatment with papain.

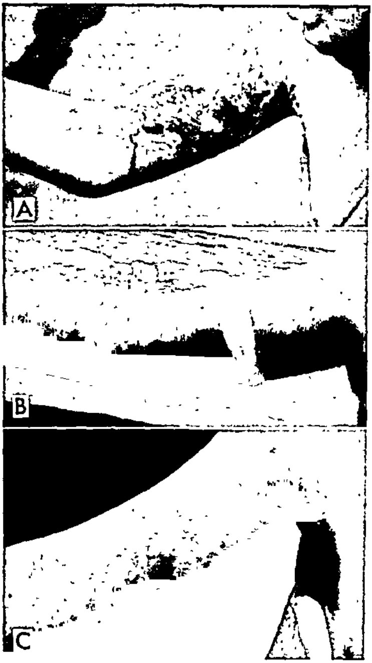

Fig. 3 (Case 15).—*A*, second and third degree burn of arm with solidified fibrin crusts. *B*, same patient after forty-eight hours of treatment with papain and streptokinase-streptodornase. Upper half treated with papain, lower half with streptokinase-streptodornase. *C*, same patient showing completely clean area.

There are many brands of papain in the market which vary greatly in potency. The fibrinolytic potency of the enzyme has been compared in 3 cases with that of a standard preparation of streptokinase-streptodornase and found to be similar.

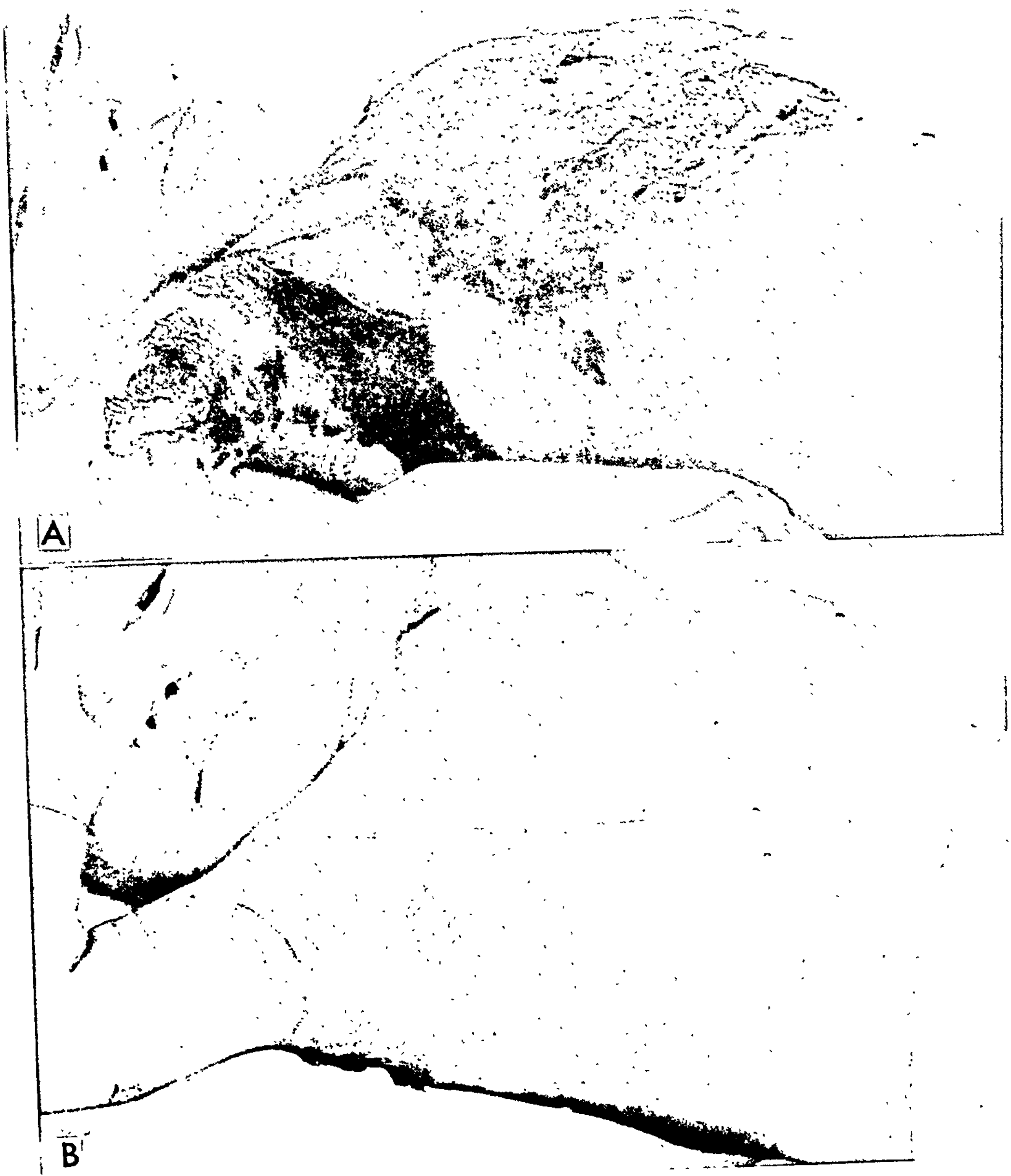

Fig. 4.—*A*, second and third degree burn of chin, neck, arm and chest, noninfected but with dry, hard crusts. *B*, same patient after twenty-four hours of treatment with papain. The area is completely clean.

Two methods have been used: (1) direct application of the powder and (2) application of dressings soaked with solutions of the enzyme. Both are effective, provided that the lesion and the dressings do not dry within a minimum period of twenty-four hours.

Papain has not caused any deleterious action on healthy tissues, and systemic or generalized reactions have not been noticed during its application. The powder and solutions used were not bacteriologically sterile, nevertheless, no reaction attributable to their application has been observed.

Finally, the cost of papain is so low that any hospital or patient can afford to use it extensively.

RÉSUMÉ

Le facteur fibrolytique de la papain est d'une très grande utilité pour débrider les infections nécrotiques. On s'en est servi pour guérir 20 différents cas de suppuration. On l'emploie souvent au lieu de la streptokinase et la streptodermase. Deux procédés sont en usage à savoir: (a) 1° le saupoudrage de la plaie, (b) 2° par pansement humidifié à l'aide du produit. Le second traitement doit durer au moins 24 heures.

La *papain n'est nullement nocive pour* les tissus sains. Ce produit ne coûte pas cher.

CONCLUSIONI

La papaina, che è un enzima fibrinolitico, è un farmaco molto efficace per la cura delle suppurazioni croniche e delle necrosi superficiali. Essa ha trovato impiego in 20 casi con lesioni varie fra cui ustioni di 2° e 3° grado, ulcere croniche della gamba, gangrena e carbonchio, suppurazioni croniche e croste secche.

Ve ne è di diverse qualità in commercio, variamente efficaci. La loro potenza è stata controllata, *in 3 casi, col confronto* con preparazioni tipiche di streptochinasi-streptodornasi, ed è risultata pari a queste. La papaina è stata usata in polvere per applicazione diretta o in soluzione per impacchi; entrambi i metodi sono risultata efficaci, a patto che lesioni e medicazioni non si seccassero entro un periodo di 24 ore. Non si è riscontrato nessun effetto dannoso sullo stato dei tessuti, nè reazioni locali o generali. Il preparato è stato usato senza preacauzioni di sterilità, e ciò non di meno non si sono avute reazioni. Il suo costo è così basso da consentirne l'uso indiscriminato.

SCHLUSSFOLGERUNGEN

Als ein wirksames zum Debridement führendes Mittel bei der Behandlung chronisch eiternder und nekrotischer Gebiete wird das fibrinolytische Ferment Papain in Vorschlag gebracht. Es ist bei 20 Patienten mit verschiedenen Erkrankungen, zu denen Verbrennungen zweiten und dritten Grades, chronische Unterschenkelgeschwüre, Gangrän, Karbunkel, chronische Eiterungen und trockene Krustenbildungen gehörten, angewendet worden.

Es befinden sich viele Papainpräparate *im Handel, die in ihrer Wirksamkeit sehr* grosse Unterschiede aufweisen. Die fibrinolytische Stärke von drei Präparaten wurde *mit der eines Standare präparates von* Streptokinase - Streptodornase verglichen und erwies sich in allen Fällen als ähnlich.

Es gelangen zwei Verfahren zur Anwendung: (1) die direkte Applikation des Pulvers und (2) das Anlegen von mit der Enzymlösung getränkten Verbänden. Vorausgesetzt, dass die Verbände und das erkrankte Gewebe wenigstens innerhalb der ersten 24 Stunden nicht austrocknen, sind beide Methoden wirksam.

Das Papain hat keinen schädlichen Einfluss auf gesundes Gewebe, und allgemeine oder Systemreaktionen sind während seiner Anwendung nicht beobachtet worden. Obgleich das Pulver und die Lösungen nicht bakteriologisch steril waren, traten keine Reaktionen auf, die der Anwendung des Mittels zugeschrieben werden könnten.

Schliesslich wird *auf die geringen* Kosten des Papains hingewiesen, die jedem Krankenhaus und allen Patienten eine ausgiebige Verwendung des Mittels gestatten.

CONCLUSIONES

Se sugiere que la papina enzima fibrinolítica, es un agente potente y efectivo en la debridación, para el tratamiento de areas necróticas y con supuración crónica. Se ha usado en el tratamiento de 20 pacientes con diversas lesiones incluyendo quemaduras de segundo y tercer grado, úlceras crónicas de la pierna, grangrenas,

carbunco, supuración crónica y costras secas.

Existen en el mercado muchas marcas de papacína que varían grandemente en su potencia. La potencia fibrinolítica de la enzima ha sido comparada en 3 casos con la de una preparación standard de estreptoquinasa - estreptodornasa, encontrándose semejante.

Se han usado dos métodos: (1) aplicación directa del polvo y (2) aplicación de apósitos mojados con soluciones enzimáticas. Ambos son efectivos, evitando que la lesión ó apósitos no se sequen dentro de un período mínimo de veinticuatro horas.

La papaína no ha producido ningun efecto destructivo sobre tejidos sanos y durante su aplicación no se han notado reacciones sistémicas ó generalizadas. El polvo y las soluciones usadas no fueron estériles bacteriológicamente; sin embargo, no se observó ninguna reacción atribuíble a su aplicación.

Finalmente, el costo de la papaína es tan bajo que cualquier hospital é paciente puede resistir su uso amplio.

CONCLUSOES

Os autôres sugerem que a papaina, uma enzima fibrinolitica, seja um poderoso agente para o desbridamento e tratamento de supirações crônicas e areas de necrose. Fez o tratamento em 20 doentes com varias lesões, incluindo queimaduras de 2° e 3° gráus, ulceras crônicas das pernas, gangrêna, carbunculo, supurações crônicas, etc.

Existem varios tipos de paina no mercado, que variam muito em sua porcentagem. O poder fibrinolitico da enzima foi comparado em tres casos, revelando-se similar ao da streptokinase - streptodornase.

Foram utilizados dois processos: 1) aplicação direta do pó, e, 2) aplicações de compressas embebidas em soluções da enzima. Ambos do revelaram eficientes.

Concluem os autôres ressaltando o baixo custo da papaina, de modo a permit ir que seja usada em qualquer Hospital e por qualquer doente.

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Twenty Years' Experience with Myomectomy During the Childbearing Period

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THE purpose of this paper is to present my experience with enucleation of fibroids from the uterus as a method of saving the function of this organ. The report, therefore, includes only the cases of women whose ages place them in the so-called childbearing period. This operative experience extends over the past twenty years.

The reproductive period in women averages about thirty years. It begins with puberty and terminates with the end of the menopause. In this report the youngest woman on whom myomectomy was performed was 25 years old, and the eldest was 43. Thus, this series of cases falls well within the limits established for reproductivity. Since the primal purpose of performing myomectomy on these patients was to preserve the physiologic function of the uterus, the operation was particularly indicated for women in the younger age group. However, the older women were by no means excluded from this treatment; many of the patients operated on were in their late thirties, and a few were slightly over 40. However, in older women one usually is confronted with other serious pelvic pathologic change associated with the myomas. This fact, together with the fact that the reproductive period is at or near its conclusion, frequently precludes myomectomy. This was true of many of my own patients.

Fibroids, as they grow, greatly distort the anatomic character of the uterus. This not only causes uterine physiologic disturbance but frequently, owing to the size and location of the tumors, injures the function of neighboring extragenital viscera. Among these associated organs are the bladder, the ureters, the adnexae and the pelvic blood vessels.

It is desirable, therefore, to remove fibroids occurring in young women, regardless of the size and number of the growths, to prevent further damage to these vital structures. Another reason for early operation, if myomectomy is considered, is that the myomas are small and therefore present no serious surgical problem. Large myomas, however, can usually be enucleated without too much difficulty, and one should not hesitate to remove them because of their size. The study of the series of case histories used for this presentation includes a general survey of the subject of fibroid uteri, with particular emphasis upon the age of the patient operated, the postoperative anatomic uterine picture, and the physiologic relation of the uterus to the menstrual function and to childbearing. Likewise, a certain amount of stress is placed on sterility as a symptom and on the association of carcinoma of the uterus with uterine fibroids.

At the beginning of this project I was somewhat hesitant, viewing with some apprehension the enucleation of fibromas, particularly large ones, as contrasted to their complete removal by hysterectomy. This hesitancy was predicated on postgraduate training as well as on the apparent attitude of many gynecologists and surgeons of my acquaintance some twenty years ago. It was the consensus then, and apparently, to some degree, even now, that myomectomy is ineffective, since the uterus is prone to produce more tumors of this type and therefore is likely to require a subsequent operation or [illegible], the

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final one of which would be complete removal of the uterus. In other words, most authors and operating surgeons appeared to be convinced that myomectomy was ineffective—much ado about nothing. My experience indicates that a definite opinion can be formed for the solution of this vexing problem; therefore, the following study was attempted. It will be presented in the hope that the information may aid others who are confronted with the treatment of this surgical condition. The investigation covers the cases of 58 women from whom fibroids were removed by enucleation and whose case histories will be considered from the standpoint of age, symptoms, associated pelvic pathologic conditions and gross pathologic observations of the fibromas and the myometrium; the microscopic pathologic appearance of the tumors and endometrium, including degenerative changes and malignant degeneration, and, finally, the postoperative period in relation to the recurrence of myomas and involution of the myometrium. An estimate of the rate of growth of fibroids is included.

Age.—Since the preservation of a normally functioning uterus was the major objective in this series of operations, the patients were, naturally, women whose ages placed them in the childbearing period. Of the 58 women operated on, the youngest was 25 years old and the oldest 43. A breakdown of the intervening years into age categories of 25 to 30 inclusive, 31 to 35 inclusive, 36 to 40 inclusive, and 41 to 43 inclusive indicates that 14, or 24.1 per cent, fell into the first group; 25, or 43.1 per cent, into the second group; 14, or 24.1 per cent, into the third group, and only 5, or 8.6 per cent, into the last group, 41 to 43 years.

Thirty-nine patients, or 67.2 per cent, therefore, were 25 to 35 years old, while only 19, or 32.7 per cent, were in the older age group. These figures are what one would expect, since myomectomy, for the many reasons mentioned, is particularly indicated for younger women. It may be of interest to mention that I have never considered it necessary to perform a hysterectomy on a young woman for the removal of fibroids, despite the fact that many of the tumors encountered were very large.

Symptoms.—A consideration of the various complaints of the patients in this series indicates that backache and a sensation of weight in the pelvis were the most common disturbances. These symptoms occurred in 30 cases. Nineteen of the women complained of menorrhagia, while 8 mentioned sterility as the chief complaint. A few women noted bladder disturbances, and 2 or 3 suffered no particular discomfort but had either discovered or been told of a lump in the lower part of the abdomen. Two women suffered from painful menstruation.

Associated Pelvic Disease.—The most common associated abnormality of the pelvis in this group of patients was retrodisplacement of the uterus, a condition that occurred in 34 cases. Endometriosis was present in 4 patients and adenomyosis of a fibroid in 2. Six patients had ovarian cysts, and in 5 cases tubal occlusion was present. Chronic cervicitis-endocervicitis was, likewise, a fairly common associated pathologic change.

Gross Pathologic Picture of the Fibromas and the Myometrium.—Forty-two women, or 72.4 per cent, exhibited multiple fibromas of the uterus, while only 16, or 27.5 per cent, had single myomas. The greatest number of tumors enucleated in a single case was 17, but this, of course, was unusual; the average number of fibroids encountered was 4 or 5.

The size of the tumors varied considerably. The largest tumor removed was a single myoma with a diameter of 8 inches (20 cm.). Most of the myomas were smaller, the average diameter being 1 to 3 inches (2.5 to 7.5 cm.) in diameter. There were also many tiny tumors, and some were of the seedling variety. Anatomically, the great majority of patients had either intramural or subserous tumors; however, 19 exhibited submucous myomas alone or in combination with the other two anatomic types. The myometrium at the time of operation was hypertrophied in every case.

This is, of course, to be expected and is explained by the effort made by the uterine muscularis to rid itself of the new growths.

Microscopic Pathologic Picture of the Tumors and Endometrium.—The most common degenerative change in the tumors removed was hyaline degeneration. This occurred in 51 cases. Cystic and calcareous degeneration occurred in 4 cases, and necrosis, red degeneration, and myxomatous degeneration occurred in 1 instance each. Dilation and curettage were done in 54 cases, and in all of these the endometrium was reported to be normal. No patient had associated adenocarcinoma of the corpus uteri, nor did any exhibit sarcomatous degeneration of a fibroid. Incidentally, none of these patients had carcinoma of the cervix.

Postoperative Period.—With regard to the postoperative time lapse, 15 women were operated on ten years ago or longer. In 32 cases the postoperative period is over five years; in 42, at least four years have elapsed since the myomectomy. In the remainder the postoperative period is less than four years.

Results.—A careful surgical follow-up on all but 5 of this series of patients indicates that in only 2 have myomas developed in the uterus since the operation. It is curious that in both cases the recurrent myomas were discovered after an operative lapse of ten years, and that an estimation of the size of the tumors in both women by bi-manual examination indicated that the diameter of the tumors was about 1 inch (2.5 cm.). It would appear, therefore, that fibroids grow very slowly, and that a considerable period must elapse before a seedling myoma is large enough to cause serious uterine distortion or impair the physiologic function of the uterus.

The involution of the myometrium was complete in all of the patients within a very short time after the operation. This happy fact should be expected since the foreign body stimulus was removed. The mortality figure was most gratifying, also, since no patient died from the operation. None of the women exhibited significant morbidity, and in general the pelvic well-being of all the patients was highly satisfactory.

A study of these patients with regard to pregnancy following the operation was very pleasing to me. Eleven have borne from 1 to 4 children, since the myomectomy. In 9 of these cases, apparent preoperative sterility was cured after myomectomy. In other instances the patient continued to be sterile. Three patients complained of 1 to 2 abortions before myomectomy, and 1 woman had a miscarriage subsequent to the operation.

COMMENT

If one considers the total number of the myomectomies performed, the number of successful pregnancies following operation is not very encouraging. In the interest of fairness however, it must be said that many other factors, such as male sterility, failure to marry, and the lack of desire for children no doubt contributed greatly to the poor showing. At least the uterus was perserved for its proper function in this latter group.

It will be said, and justly so, that a series of 58 operations for the cure of a pathologic lesion, or for any other purpose, is too small to justify one in drawing a serious conclusion as to its effectiveness. The indication for myomectomy, however, does not occur very often in one surgeon's gynecologic experience, and, although only theoretical conclusions can be developed from this group of patients, the observations are rather interesting.

It is noteworthy that in every patient who complained of menorrhagia a fibroid was discovered in the submucous location. None of the patients who failed to exhibit a submucous fibroid complained of profuse menstrual flow.

A study of this group of patients does not permit one to argue that fibroids necessarily produce sterility, although this seems quite possible, even probable. No conclusion, likewise, can be drawn from this study to indicate that uterine myomas cause miscarriages. One may state with a fair degree of certainty that the presence of fibroids in the uterus does not predispose the patient to carcinomatous degeneration of the endometrium. In my opinion, this association of diseases, commonly mentioned in textbooks and in the literature, can probably be explained by the fact that the patients studied are of advancing age. It is true that carcinoma of the endometrium and fibroids is fairly common in women during the fourth and fifth decades of life, but the fact that adenocarcinoma of the corpus uteri does not occur in younger women probably explains the fact that none of the patients in this series exhibited epithelial malignant change. In the 2 cases of postoperative recurrent fibromas, it is noteworthy that the tumors were small and that the postoperative time lapse was ten years. These facts seem to indicate that one may expect a serviceable uterus for at least five years after enucleation of fibromas from the myometrium.

It is my opinion that the uterus after myomectomy is capable of carrying on its normal physiologic function if other factors associated with fertility are normal.

SUMMARY

1. Fifty-eight women in the child-bearing age were relieved of their uterine fibroids by means of myomectomy.
2. The ages of 39 of the 58 ranged from 25 to 35 years.
3. The most common symptoms were backache, pain in the lower part of the abdomen and menorrhagia.
4. Other genital pathologic change was associated with fibroids in about the usual percentage.
5. Most of the patients had multiple fibromas.
6. Anatomically, a great majority of the myomas were either subserous or intramural.
7. The most common degenerative change was hyaline degeneration. There was no instance of sarcomatous degeneration or associated adenocarcinoma of the corpus uteri.
8. All women on whom curettage was performed presented normal endometrium microscopically.
9. In 2 patients there was recurrence of the fibromas. The tumors were 1 inch (2.5 cm.) in diameter and occurred approximately ten years after the operation.
10. Eleven patients have been delivered of 1 to 4 children since the myomectomy.
11. No operative mortality and no significant operative morbidity occurred in this series of patients.

CONCLUSION

The author, from his experience with myomectomy in 58 cases, recommends this procedure as a means of salvaging the uterus for its normal functional purposes. Although there is apparently a distinct possibility of tumor recurrence, the slowness of growth of the tumors, in his opinion, will permit the uterus to function normally for several years after the operation. This period is ample for one or two pregnancies to develop and be successfully concluded, and, if this happy event occurs, it is most gratifying to both patient and obstetrician.

CONCLUSIONI RIASSUNTIVE

1. 58 donne furono curate per fibromi uterini mediante miomectomia eseguita nell' epoca della maturità sessuale.
2. L'età di 39 delle 58 pazienti, si aggirava dai 25 ai 35 anni.
3. I sintomi più comuni erano mal di schiena, dolori al basso addome, e menorragia.
4. Alterazioni patologiche, nella percentuale solita, erano associate ai fibromi.
5. La maggior parte delle pazienti aveva fibromi multipli.
6. Anatomicamente la maggior parte dei fibromi erano sottosierosi o intramurali.
7. Il più frequente tipo di degenerazione fu quello della degenerazione jalina.

Non si ebbero casi con degenerazione sarcomatosa nè associazione con adenocarcinomi del corpo dell'utero.

8. Tutte le donne nelle quali si praticò il raschiamento presentavano un endometrio microscopicamente normale.

9. In 2 pazienti si ebbe recidiva dei fibromo. I tumori avevano un diametro di 1 pollice (12,5 cm.) e si verificazono approsimativamente a lo anni di distanza dall'intervento.

10. Undici pazienti partorirono, dopo la miomectomia, da 1 a 4 bambini.

11. In questa serie non si ebbe alcuna mortalità operatoria nè malattie post-operatorie di qualche importanza.

L'Autore, in base alla sua esperienza su 58 casi di miomectomie, raccomanda tale trattamento inteso a salvare l'utero. Benchè esista la possibilità di recidive tumorali, la loro scarsa incidenza permette la normale funzione uterina per parecchi anni dopo l'intervento. Tale periodo è abbastanza lungo per permettere lo svolgersi ed il compiersi, felicemente, di una o due gravidanze; e tale evento, qualora si verifichi, è di grande soddisfazione tanto per l'ostetrico che per la paziente.

RESUMEN Y CONCLUSIONES

1. Cincuenta y ocho mujeres en la edad gestacional, fueron tratadas de sus fibromas uterinos por medio de miomectomía.

2. Las edades de 39 de las 58, variaron de 25 a 35 años.

3. Los síntomas más comunes fueron dolor de cabeza, dolor en la parte inferior del abdomen y menorragia.

4. Con los fibromas se asociaron otros cambios genitales patológicos en proporción habitual.

5. La mayoría de las pacientes tenían fibromas múltiples.

6. Anatomicamente, la gran mayoría de los fibromas eran subserosos ó intramurales.

7. La degeneración hialina fué el cambio degenerativo más frecuente. No hubo ningún caso de degeneración sarcomatosa ó adenocarcinoma concomitante del cuerpo uterino.

8. Todas las mujeres en las que se hizo raspa, presentaron endometrio microscópicamente normal.

9. En dos pacientes se presentó recidiva de los fibromas. Los tumores fueron de 12.5 cm. de diámetro y ocurrieron aproximadamente después de diez años de la operación.

10. Once pacientes han dado a luz de 1 a 4 niños después de la miomectomía.

11. En esta serie de pacientes no ocurrió mortalidad ó morbilidad operatoria significativa.

Por su experiencia con miomectomía en 58 casos, el autor recomienda el procedimiento como un medio de conservación del útero para sus funciones normales. Aun cuando existe una posibilidad de recurrencia, la lentitud en el crecimiento de los tumores, permitiría al útero funcionar normalmente por varios años después de la operación. Este período es suficiente para el desarrollo de uno ó dos embarazos, si esto ocurre es muy satisfactorio para el paciente y el obstetra.

RÉSUMÉ

L'auteur rapporte 58 cas de femmes, d,âge d'avoir des enfants, opérées de fibrome utérin par la myomectomie. L'auteur donne l'étiologie, la symptomatologie, la pathologie et l'anatomie pathologique de cette lésion. Le curetage utérin a toujours montré un endomètre normal. L'auteur donne aussi des détails instructifs sur quelques cas et termine par des remarques fort à propos sur l'utilité de cette intervention chez des patientes encore capable de devenir parturientes.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. 58 Frauen der gebärfähigen Altersgruppe wurden mittels Myomektomie von ihren Uterusymomen befreit.

2. 39 dieser Patientinnen befanden sich im Alter von 25 bis 35 Jahren.

3. Die häufigsten Symptome bestand

in Rückenschmerzen, Unterleibs-schmerzen und Menorrhagien.

4. Krankhafte Veränderungen des Geschlechtsapparates anderer Art bestanden neben den Myomen im üblichen Prozentsatz.

5. Die meisten Patientinnen hatten mehrere Myome aufzuweisen.

6. Die grosse Mehrzahl der Myome war entweder subserös oder intramural gelegen.

7. Von degenerativen Veränderungen war die hyaline Entartung die häufigste. In keinem Fall kam eine sarkomatöse Entartung oder ein gleichzeitig bestehendes Adenokarzinom des Gebärmutterkörpers zur Beobachtung.

8. Alle Frauen, an denen eine Ausschabung vorgenommen wurde, wiesen mikroskopisch ein normales Endometrium auf.

9. Bei zwei Kranken kam es zum Wiederauftreten von Myomen. Die Geschwülste hatten einen Durchmesser von 2,5 cm und traten etwa *zehn* Jahre nach der Operation auf.

10. Elf der Patientinnen entbanden nach der Myomektomie ein- bis viermal.

11. Die vorliegende Series hat weder einen Todesfall als Operationsfolge noch eine wesentliche postoperative Morbidität aufzuweisen.

Auf Grund seiner Erfahrungen an 58 myomektomierten Kranken empfiehlt der Verfasser diese Operation mit dem Ziel, die Gebärmutter und ihre normale Funktion zu erhalten. Wenn auch offenbar eine Möglichkeit des Wiederauftretens einer Geschwulst besteht, so gibt doch nach Ansicht des Verfassers ihr langsames Wachstum dem Uterus für einige Jahre nach der Operation die Möglichkeit normaler Funktion. Der gewonnene Zeitraum ist für das Austragen und die erfolgreiche Beendigung von ein bis zwei Schwangerschaften völlig ausreichend, und wenn as dazu kommt, ist es sowhol für die Patientin als auch für den Arzt ein höchst erfreuliches Ereignis.

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Surgical Treatment of Bilateral Lithiasis

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BILATERAL renal lithiasis confronts the surgeon with problems identical with those of unilateral lithiasis, but, in addition, it often presents special problems resulting from the gravity of the disease.

In the course of the past six years this clinic has had 110 cases of bilateral lithiasis, amounting to 10 per cent of all cases of renal lithiasis. There was an increased frequency of bilateral lithiasis during the three or four years following the Second World War (1945-1948). The First World War, also, was followed by a wave of lithiasis, which is explained by bad and difficult living conditions in wartime. As our clinic is the only urologic center for a population of 7,000,000 I am convinced that the frequency observed is real.

Bilateral lithiasis places before the surgeon a number of complex problems, of which those following deserve mention:

1. The etiologic problem. For adequate treatment of bilateral lithiasis, one must be well aware of the etiologic factors and *try to eliminate them, as bilateral lithiasis* menaces not only the kidney, but the organism also.

2. The functional problem. Functional explorations must be as meticulous as possible, for the surgeon must know not only the separate functional state of each kidney but the total function, which is much more often troubled with bilateral than with unilateral lithiasis.

3. The problem of indications. Pyelographic study is useful not only with regard to indications but in the planning of the operative work to be done. This is of great importance, for operations on the kidney are much more responsible when the surgeon deals with bilateral lithiasis. In determining the indications, the surgeon must be much more careful with bilateral than with unilateral lithiasis.

4. The problem of conserving the kidney. Again the surgeon must likewise be much more presevering with bilateral than with unilateral lithiasis.

5. The problem of renal function. In the immediate postoperative period, the surgeon is much more concerned over the renal function in a patient with bilateral lithiasis than in one whose condition is unilateral.

6. The problem of recurrence, toward which the tendency is strong. The surgeon must be persevering in the suppression of factors leading thereto (stasis, infection).

The Calculi.—The volume, number, position and structure of the calculi must be considered in determining cause and evolution, for this will facilitate treatment.

As regards the number of calculi, our clinic has encountered multiple lithiasis on both sides in 57 cases; multiple lithiasis on one side and solitary lithiasis on the other in 25 cases, and solitary lithiasis on both sides in 28 cases.

This shows the real gravity of this lithiasis. The multiplicity of calculi on both sides in more than half of the cases
towards forma-
to alteration of
the functional and anatomic state of the kidney.

With regard to the disposition of the calculi, they were symmetric in 103 cases and asymmetric in 7.

The term "symmetric lithiasis" indicates a certain similarity on the two sides as regards the anatomic structure of the kidney and the number, position, volume and evolution of the calculi. Particular

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attention should be paid to the evolution of the lithiasis, for it is the evolution that best shows the symmetry of bilateral lithiasis.

Types of Bilateral Lithiasis.—In treating bilateral lithiasis at the clinic we have been able to make some conclusions that permit us to distinguish certain types of bilateral lithiasis. This is of great help both in the investigation of the cause and in the treatment itself. Here are some types:

1. There may be a multitude of small round uric calculi, eliminating themselves easily through the natural passages. Such processes last for years and depend on overalimentation, as is the case with many "great eaters" living in the Pannonian Plain of our country, where cholelithiasis also shows an enormous frequency.

2. Lithiasis may occur in persons immobilized by fractures, especially by bone injuries in war. Immobilization is the cause of certain conditions that facilitate the appearance of lithiasis in the urinary passages. Several phenomena are involved here: decalcification of the entire immobilized skeleton, increased elimination of calcium through the urine (hypercalcuria), change of solubility of the salts in the urine (caused by hypercalcuria), infection of the heart of the fracture, causing an abundant elimination of microbic toxins, as well as the passage of microbes through the kidneys, which undergo slow necrobiosis at the top of the papilla. This again creates the possibility of incrustation, i. e., the beginning of the formation of a calculus.

We have had 40 cases of lithiasis in immobilized persons. In 32 cases the lithiasis was renal, and in 11 of these it was bilateral.

The lithiasis occurring in persons immobilized for various other illnesses, and the lithiasis observed in overfed persons have similar causes.

3. Massive bilateral lithiasis may be based on hyperparathyroidism. This type of lithiasis must be borne in mind in the presence of massive, bilateral and recidivous lithiasis. The frequency of lithiasis with hyperparathyroidism has been estimated at 81 per cent (Chute), while others have noted it in 47 of 67 cases (Cope) and in 14 of 18 cases (Cook and Keating). Nevertheless, hyperparathyroidism does not account for a large percentage of cases of lithiasis taken in general. Hypercalcemia, hypercalcuria, hypophosphatemia and hyperphosphaturia are characteristic of the metabolic troubles associated with hyperparathyroidism. Checking calcuria and phosphatemia dosages in 40 cases of bilateral lithiasis, I observed hypercalcemia in only 8, whereas hypophosphatemia amounted to a deficiency of less than 2.5 mg. in 6 cases and between 2.5 and 3 mg. in 4 cases. But there are also cases of latent hyperparathyroidism, in which metabolic troubles are not so significant. This compels one to be alert to the possibility of hyperparathyroidism when dealing with bilateral lithiasis showing strong and prompt recidivism.

4. Coralliform bilateral lithiasis may occur, molding the calyces. This lithiasis develops quickly and tends to fill the calyces completely; the calculi, if multiple at the beginning, soon melt together. The growth of the calculi and the recurrent tendency are so strong that the operation will inevitably be followed by repeated relapses. The reasons are metabolic troubles —that is to say, this kind of lithiasis is based on general factors; local (renal) factors have but little bearing on the cause. Investigations in the direction of hyperparathyroidism give negative results.

This lithiasis can remain little infected, even almost septic, for a long time, with renal function normal or little troubled. Later it becomes clearly infected; renal function is disturbed, and renal sclerosis cannot be suppressed even after ablation of the calculi. Recurrence inevitably follows the operation if such an operation was performed before the end of this process. On the other hand, if the lithiasis reaches stabilization and if the kidneys are not altered too much, an operation may turn out successful. Such stabilization, however, sets in only in patients aged about 60.

5. Bilateral lithiasis may occur with small, unequal, faceted, mobile calculi of the size of a peanut or smaller, and early dilatation and infection of the renal cavities. Incrustations at the top of the papilla accompany this lithiasis and remain the cause of recurrence. Infection and dilatation of the renal cavities do not recede after ablation of the calculi. It is very difficult to suppress this lithiasis, which is particularly frequent in Southern Yugoslavia, in Macedonia, where the climate is dry and hot, and food in general is poor.

6. Oxalic or uric lithiasis may occur, in which the calculi remain small and eliminate themselves spontaneously, accompanied by renal colic. Recidivism is possible, but the tendency toward elimination is so strong that the patients, although they may suffer for years, may finally recover without an operation.

7. Bilateral lithiasis may be associated with solitary calculi on both sides which remain solitary. Renal function is conserved; infection is weak and intermittent. Ablation of the calculus solves the problem and suppresses the lithiasis. Recurrence is rare.

In making this classification I took the following factors into consideration: (a) the aspect of the calculi; (b) the tendency of the calculi towards growth, fusion and elimination; (c) the disposition and volume of the calculi; (d) the anatomic state of the renal cavities; (e) the functional state of the kidneys; (f) infection and suppuration; (g) the tendency toward recurrence, and (h) the evolution of the calculi.

This division of bilateral lithiasis into types is an attempt to facilitate treatment and to impress the urologist with the fact that he must not look for identical factors in studying the causes of lithiasis in various cases.

The Kidney and the Pelvis.—The anatomic state of the kidney in the presence of bilateral lithiasis may remain unaltered for a long time, or it may be gravely affected. The following variations have been observed:

1. The condition is good on both sides. This is the case with small solitary calculi that either eliminate themselves spontaneously or remain in the kidney, causing intermittent colic. Even solitary calculi of considerable size can leave the renal cavities intact, as the upper urinary vessels remain open.

2. On one side there may be a solitary calculus, with multiple lithiasis on the other. The first kidney is normal or almost normal; the second is altered by dilatation and infection. The lithiasis is asymmetric.

3. The lithiasis may be multiple on both sides, the cavities being dilated and infected. The anatomic and functional state is gravely affected bilaterally. The lithiasis is symmetric and serious.

4. The lithiasis may be coralliform on both sides. The cavities remain undilated for a long time, and infection may remain insignificant. Renal sclerosis advances slowly. If this type of lithiasis begins in youth, renal insufficiency will shorten life; if, however, it sets in at a certain later age, it will hardly affect the patient's life expectancy.

5. On one side there may be solitary or multiple lithiasis but a good anatomic condition, and on the other side calculous pyonephrosis. In terms of time the evolution is asymmetric, for the side that is little affected may show a tendency to suppuration, but evolution on that side is much slower.

6. Infection as well as dilatation may be grave on both sides. The renal tissue is greatly reduced; the kidneys are working with their maximum force. This is the final phase of bilateral and usually multiple lithiasis.

Suppuration complicates treatment, encourages recurrence and disturbs renal function. It is the cause of complications arising in the course of evolution (pyelonephritis, abscess of the kidney, pyonephrosis, perinephritis). Suppuration is more frequent with bilateral than with unilateral lithiasis. In this series our findings were: suppuration was absent or negligible in 30 cases; weak but persistent in 34, and was considerable in 46.

Renal Function.—Renal function may follow any of the patterns here listed:

1. The function is normal or almost normal on both sides. This is the case with *solitary bilateral lithiasis. Multiple* lithiasis can, at the beginning, leave the kidneys intact.
2. On one side the function is normal or little troubled; on the other it is plainly altered.
3. On one side the function is normal or little troubled; on the other it is completely abolished (pyonephrosis, hydronephrosis).
4. The function is altered on one side and completely abolished on the other.
5. The function is plainly altered on both sides. This leads to grave renal insufficiency.

Alteration in function is not only the result of progressive evolution, whether slow or fast, of bilateral lithiasis, but is caused also by unforeseen complications (acute infections, frequent or complete obstructions).

Medical Treatment.—Medical treatment of bilateral lithiasis is indicated in the following circumstances:

1. When the calculi are small and can be eliminated through the natural passages.
2. When the calculi have formed in immobilized or overfed persons, or in association with bone injuries. Here, treatment should be carried on by medical means only as long as the etiologic factors exist.
3. When the calculi have altered renal function to such an extent that the kidneys would be incapable of coping with the postoperative work.
4. When there are bilateral coralliform calculi causing only minor disturbance of urinary elimination.
5. When medical treatment can improve the condition of the better kidney so much that surgical intervention at the other kidney is made possible at a later date.
6. When the patient's general condition does not favor an operation, so that only medical treatment is left.

The medical methods are the same as those employed for unilateral lithiasis. Emphasis is placed on the use of antibiotics and antiseptics, as well as the practice of pelvic lavage with G è M Solution (Albright and others).

Operative Treatment.—The bilaterality of the lithiasis compels the surgeon to proceed to adequate, prudent treatment without delay. The surgeon must determine the indications for treatment, choosing at the same time the method, the time and the side of intervention.

Choice of the Side: Although there are surgeons who operate on the two sides simultaneously (Hryntschak, Priestley and Schulte, Gibson), the majority operate on one side only. In choosing the side for the first operation, the surgeon may be guided *by following schemes:*

1. The calculus is solitary on both sides; renal function is good on both sides; the surgeon may operate on either.
2. On one side the calculus is solitary and function is good. On the other side the calculi are multiple and function is disturbed. The surgeon must intervene on the first (better) side in order to preserve that kidney, as it is possible that the other may have to be removed later.
3. The lithiasis is multiple on both sides, and renal function is disturbed to an equal extent on either. The surgeon may operate on either side, but he will choose the side that appears to him to be a little better, or the side on which the intervention will be easier.
4. The lithiasis is multiple on both sides, but on one side there are complications menacing the kidney and even the patient's life (perinephritis, abscess of the kidney, febrile pelvic retention). The surgeon must first perform a nephrostomy (or, exceptionally, a nephrectomy) on the side showing the complications. Under cover of the nephrostomy, he can, later on, operate on the other kidney.
5. Both kidneys are altered, but one of them shows greater changes and at the same time more suppuration. It is this kidney that must be operated upon, in order to enable the other to maintain the total renal function when the operatively treated kidney (the worse one) undergoes a considerable diminuation of its function during the postoperative period.

6. The lithiasis is coralliform on both sides and makes virtual "moldings" of the calyces. Renal function remains good, and urine elimination is not disturbed or is disturbed but slightly. Intervention is difficult; suppuration is negligibly small, and the surgeon will do best to abstain. If, however, despite its coralliform appearance, the lithiasis shows multiple calculi filling the renal cavities and remaining divided in several groups molding the pelvis and the calyces, and if the patient is about 60 years old, with the "diathesis" apparently ended and suppuration weak, the surgeon must operate on one side (it makes no difference which) in order to preserve at least one kidney.

7. The lithiasis is renal on one side and ureteral on the other. The first operation should be performed on the urether.

8. The lithiasis is ureteral on both sides. The surgeon will first operate on the side with complications (obstruction) and shortly thereafter on the other. In exceptional cases the two sides may be operated on at the same time.

9. On one side the calculus is situated in the ureter; on the other, both in the ureter and in the kidney. The first operation should be done at the side of the ureteral lithiasis. Should the reno-ureteral lithiasis, however, be lodged in the kidney and the upper part of the ureter, it would appear more convenient to operate on that side, removing the ureteral and the renal calculi simultaneously.

Choice of the Time: In the case of bilateral lithiasis the surgeon will proceed to the operation after having duly carried out all examinations and necessary preparations of the patient. Depending on the case, he will have to make preparations with antibiotics (parenteral application or lavage of the pelvis). He must make a good estimate of the strength of the kidneys as regards their performance during the postoperative overload.

Choice of Method: With bilateral lithiasis this is more or less the same as with the unilateral condition, but on the whole it can be said that the surgeon should increase his efforts in the direction of conserving the kidney.

Nephrectomy must be avoided at all costs. It can be legitimate only in cases of renal complications menacing the patient's life (heavy suppurations, heavy hemorrhages after nephrotomy).

Pyelotomy is always to be preferred to nephrotomy if the surgeon can operate on one side only (advanced age).

In view of the frequent suppurations associated with bilateral lithiasis, the surgeon should not hesitate to make a nephrostomy, which will permit him to perform lavages with G or M Solution through the nephrostomy drain.

The Results.—There are few publications on the results of operations for bilateral lithiases. Cifuentes and Brongersma reported some results at the Second Congress of the International Urologic Society in Rome, in 1924. Cifuentes had a mortality rate of 20 per cent for the cases in which one side only had been operated on and 15 per cent for the cases in which operation was done on both sides (3 dead out of 20). The same author gave also the results in 15 cases in which nephrectomy had been done on one side and conservational operations on the other, with a mortality rate of 20 per cent and a recurrence rate of 15 per cent. Brongersma operated in 36 cases of bilateral lithiasis, performing altogether 65 operations (45 nephrotomies, 3 pyelotomies, 17 nephrectomies), and lost 7 patients, which amounts to a mortality rate of about 10 per cent.

My own results are as follows:

Both sides operated on, 17 cases; 2 deaths (11.75 per cent).

One side operated on, 42 cases; 5 deaths (12 per cent).

No operation, 36 cases.

Spontaneous emission of the calculi, 15 cases.

The following operations were performed: 38 pyelotomies, 33 nephrotomies or pyelonephrotomies, 5 nephrectomies, 10 ureterotomies, and 2 operations on which no data are available. The mortality rates by method of operation were: pyelotomies, 4 of 38 (10.6 per cent);

nephrotomies, 3 of 33 (9 per cent); nephrectomies (5) and ureterectomies (10), 0.

The total mortality can be summed up as follows: Of 110 patients, 7, or 6.36 per cent, died at operation (8 per cent of 86 operative cases). Seven patients died without operation, bringing the total mortality rate to 12.7 per cent. This clearly underlines the gravity of bilateral lithiasis.

Recurrence.—Because of the frequency of multiplicity and infection in cases of bilateral lithiasis, it is quite understandable that the tendency to recurrence is very strong. For lithiasis in general Marion recorded the following figures: (a) For noninfected lithiasis: 7 per cent of relapses with renal, and 2 per cent with pelvic, lithiasis; (b) for infected lithiasis with dilated cavities, 45 per cent. S. Joly noted similar figures: 3.7 per cent for pyelotomy when there was neither infection nor dilatation, 20 per cent when infection was present, and 48 per cent when both infection and dilatation of the renal cavities were in evidence. Of 24 cases of bilateral lithiasis observed for a certain time, Brongersma noted relapses in 15, or 60 per cent. Braasch fixed the percentage of recurrence of unilateral lithiasis at 10 per cent and that of bilateral lithiasis at 20 per cent. It is rather rare for lithiasis to appear in the remaining kidney after a nephrectomy done because of lithiasis, though Cifuentes cited an incidence of 15 per cent.

Of 59 patients treated in 86 operations at this clinic 12 relapsed, which indicates a frequency of 20 per cent, but a number of patients could not be seen again, so that this frequency does not give a true picture and must be considered higher.

From the standpoint of operative technic, operations on recidivous calculi are very difficult. I did 16 such operations for bilateral lithiasis; 2 of the patients died. These two losses are the only ones that occurred from 65 secondary renal operations performed by me during the last five years. The technical methods of secondary operation on the kidney have been presented by me in Lagenbeck's *Archiv* and in *Urologia.*

COMMENT

In the course of the past six years, 110 patients with reno-ureteral bilateral lithiasis have been treated at the Urologic Clinic in Belgrade.

Bilateral renal lithiasis has some etiologic peculiarities, important in examination of the functional and anatomic status of the kidneys, in the choice of indications for treatment and in the treatment itself. Bilateral lithiasis is a serious problem for the surgeon, as it menaces not only the kidney but the patient's life.

Observing the evolution of bilateral lithiasis, one can see that it shows a certain symmetry on both sides.

Studying the etiologic background, the morbid anatomic picture and the spontaneous or postoperative evolution of the disease, I have been able to trace the various types of bilateral lithiasis. On the one hand are those varieties of bilateral lithiasis in which the whole evolutionary course shows a certain benignity (solitary calculi, slight infection) and the operation has every chance of success, making possible the recovery of the patient. The same is true of lithiasis occurring in immobilized persons, in whom subsequent mobilization often removes the causes of calculus formation. On the other hand one is confronted with bilateral lithiasis for which all treatment is difficult, recurrence is frequent, infection is persistent and tenacious, and the functional and anatomic status of the kidneys are progressively altered. Such lithiasis is malignant and brings about the patient's death after years.

It is evident that the etiologic factors in bilateral lithiasis are much more general than local. In this sense there is a certain difference as compared with the causes of unilateral lithiasis.

SUMMARY

Of 110 cases of bilateral reno-ureteral lithiasis, operation on both sides was performed in 17 cases and on one side in 42 cases. In 15 cases spontaneous emission ended the evolution of the lithiasis. In 36 cases no operation was performed.

The operations performed were pyelotomy in 38 cases, nephrotomy or peylonephrotomy in 33, nephrectomy in 5, and ureterotomy in 10. A total of 86 operations has been performed on 59 patients. There were 7 operative deaths (6.36 per cent).

Of 59 patients, subjected to operation, 12 have had recurrences (20 per cent).

RIASSUNTO

Su 110 casi di calcolosi renoureterale bilaterale, 17 furono operati bilateralmente, 42 da un lato solo. In 15 casi il calcolo fu emesso spontaneamente. In 36 casi non fu eseguito alcun intervento.

In 38 casi fu eseguita una pielotomia, in 33 una nefrotomia o una pielonefrotomia, in 5 una nefrectomia, in 10 un ureterotomia. Il totale d'interventi su 59 pazienti, fu di 86. Le morti operatorie furono 7 (6,36%).

Dei 59 pazienti operati, 12 ebbero recidive (20%).

RESUMEN

En 110 casos de litiasis reno-ureteral, se llevó a cabo operación bilateral en 17 casos y unilateral en 42 casos. En los 15 casos, una emisión espontánea culminó la evolución de la litiasis. En 36 casos no se llevó a cabo ninguna operación.

Las operaciones que se practicaron fueron: pielotomía en 38 casos, nefrotomía y pielonefrotomía en 33 casos, nefrectomía en 5 casos y ureterotomía en 10 casos. En 59 pacientes se llevó a cabo un total de 86 operaciones. Hubieron 7 muertes postoperatorias (6.36 por ciento).

De los 59 pacientes sometidos a operación, 12 presentaron recidivas (20 por ciento).

RÉSUMÉ

Sur 110 cas de lithiase réno urétérale, l'opération fut pratiquée 17 fois bilatérale et 42 fois unilatérale. 30 cas ne subirent aucune intervention. Les opérations ont varié selon les cas. Il y en 20% de récidive.

ZUSAMMENFASSUNG

Unter 110 Fällen mit doppelseitiger Harnsteinerkrankung der Nieren und Harnleiter wurde in 17 Fällen eine Operation an beiden Seiten und in 42 Fällen an einer Seite ausgeführt. In 15 Fällen führte die spontane Ausscheidung der Steine zur Beendigung der Erkrankung. In 36 Fällen wurde keine Operation vorgenommen.

Die ausgeführten Operationen bestanden in 38 Fällen in einer Pyelotomie, in 33 Fällen in Nephro- oder Pyelonephrotomie, in 5 Fällen in Nierenresektion und in 10 Fällen in Harnleiterspaltung. Im Ganzen wurden 86 Operationen an 59 Kranken vorgenommen. Die Zahl der chirurgischen Todesfälle betrug sieben (6,36%).

Bei 12 von den 59 operierten Kranken kam es zu Rückfällen (20%).

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Treatment of Slipping of the Upper Femoral Epiphysis

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SLIPPING of the upper femoral epiphysis is due to softening and hypervascularity at the juncture of the capital epiphyseal plate and the femoral neck. The slipping may be sudden or gradual, slight or marked, and often there are several successive slips. As soon as slipping occurs there is a tendency toward healing by filling in with callus at the inferior and posterior angle between the displaced head and the neck. However, healing at the epiphyseal plate is slow, and the callus is usually not strong enough to prevent further slipping until the disease at the epiphyseal plate is healed or until the epiphyseal plate is closed, with solid bony union between the head and the neck.

The treatment of slipping of the upper femoral epiphysis dates back at least to 1888, when Keetley performed a subtrochanteric osteotomy for correction of the deformity. The disease had undoubtedly been treated many years earlier, under various diagnoses, but was apparently first recognized as a separate entity by Brousseau in 1867. The primary purpose of surgical treatment in the four decades following Keatley's osteotomy was the correction of deformity, either at the site of slipping by closed or open reduction, or indirectly by osteotomy through the neck or below the trochanters. In some cases the treatment was restriction of weight bearing, with or without immobilization, in order to give the disease a chance to heal. Ferguson and Howorth, in 1931, proposed that the early slips be treated by a bone-pegging operation to produce prompt exeresis or closure of the epiphyseal plate, and reported 1 case. Since that time the operation has been done on more than 200 hips, and ample time has elapsed for study of the late results in a large number of cases. During the same period internal fixation has been extensively used as a means of preventing further slipping as well as for maintaining reduction.

A series of cases in which the condition was variously treated is here summarized and illustrated.

CASE 1.—In this case a moderate slip occurred in a boy aged 14, with no treatment and a good result. A roentgenogram (Fig. 1*A*) was taken in July 1946 and showed moderate slipping downward and forward. The epiphyseal line was wide, with irregular decalcification on the distal side. Another film (Fig. 1*B*), taken in September 1949, three years later, showed that the lesion had healed nicely without treatment and without degenerative changes in the femoral head. The patient had no pain and no disability, and his limp was negligible. Abduction and internal rotation were slightly limited. This is the usual result when no treatment is given. Osteoarthritis may develop eventually because of incongruity of the head-neck juncture with the superior acetabular margin, but the symptoms will be slight, at least until middle life. The effects of treatment should be evaluated both in relation to the results observed when no treatment is given and in terms of the normal hip.

CASE 2.—The patient was a girl aged 13, and symptoms had been present for three months. The index of motion was 95. Treatment in this case consisted of partial closed reduction of a moderate downward slip, with immobilization in a cast. The result was fair, as is usual with this type of treatment.

A roentgenogram (Fig. 2*A*) was taken on Sept. 24, 1930. There was posterior displacement, as was indicated by the shallow femoral

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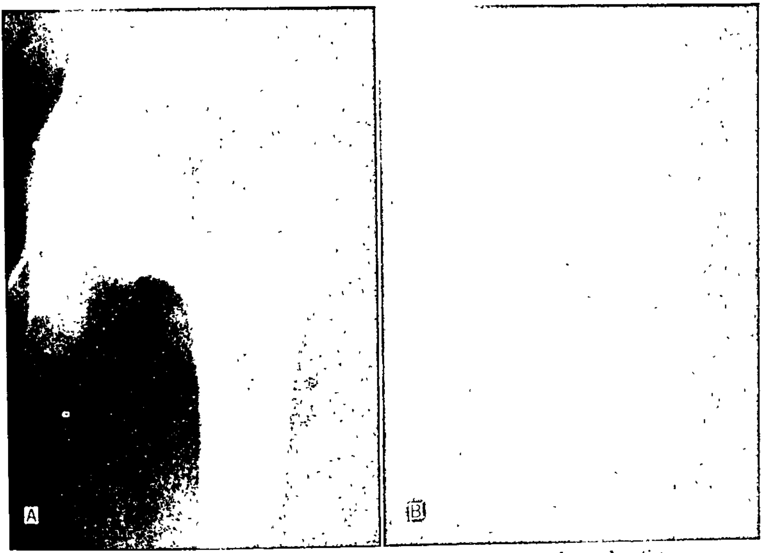

Fig. 1 (Case 1).—Moderate slip with no treatment. See text for explanation.

head and the elliptic epiphyseal line. The patient was treated with bed rest for six months, after which she resumed weight bearing. The epiphyseal line appeared to be healed. A second film (Fig. 2*B*) was taken on November 4, three weeks after the recommencement of weight bearing. There was a pronounced further slip, indicated by the new position of the femoral head and the zones of callus. Healing with bed rest alone is likely to require many months, so a closed reduction was attempted on November 17, with partial reduction of the downward dislocation. A double plaster spica was worn for three months. On March 5, 1931, four months after reduction, a third film was taken (Fig. 2*C*) and showed the epiphyseal plate healed and closing. There were mild degenerative changes in the head, and the joint space was slightly thinned. A fourth film (Fig. 2*D*), taken in November 1932, two years after reduction, showed the epiphyseal plate closed and obliterated. There was moderate decalcification at the hip; slight irregular ossification was present, and the joint space was thin superiorly. Pain, limp and disability were present. The index of motion was 50. In October 1945, fifteen years after reduction, a film (Fig. 2*E*) showed the contour of the femoral head to be irregular, with moderate marginal lipping. Ossification was slightly irregular, and the joint space was thin superiorly. Pain, limp and disability had increased. The index of motion was 40.

Case 3.—The patient was a boy aged 14. Symptoms had been present for five months, and the index of motion was 22. Reduction was accomplished by strong traction and plaster immobilization, with a fair clinical and anatomic result, one of the better results of this type of treatment. Degenerative changes, however, developed in the femoral head, and the result became much worse. A roentgenogram (Fig. 3*A*) taken on March 9, 1931, showed the head displaced downward and posteriorly ¾ inch (1.9 cm.). Two zones of callus indicated an old slip as well as a fresh one. The joint space was normal. Closed reduction by strong traction was perf

on March 11, with immobilization in plaster spica for three months. A

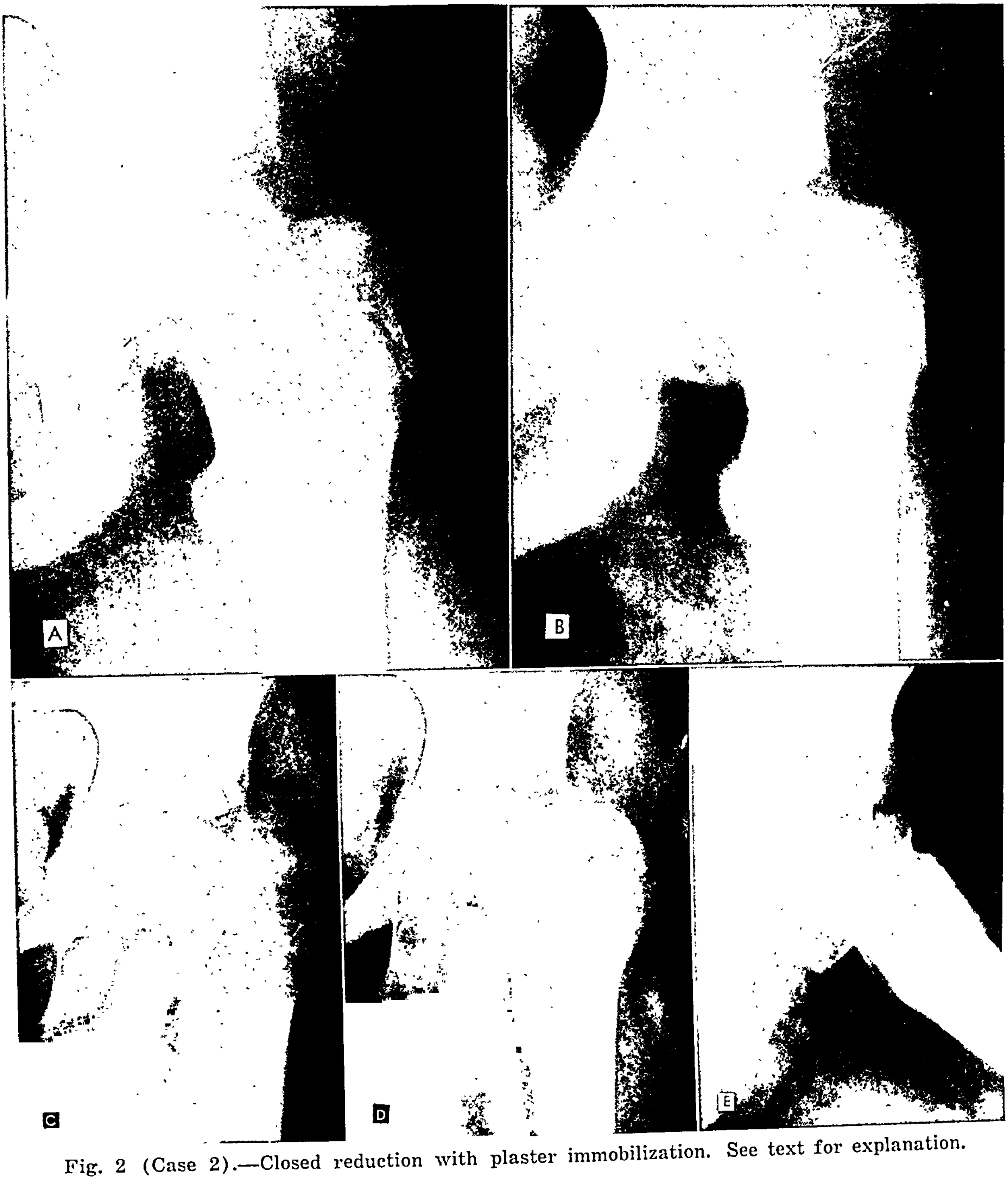

Fig. 2 (Case 2).—Closed reduction with plaster immobilization. See text for explanation.

(Fig. 3*B*), taken on June 23, three months after the operation, showed a fair reduction, with slight downward and moderate posterior displacement. The epiphyseal line had healed and was closing. A third film (Fig. 3*C*) was taken on Nov. 18, 1933, two and a half years after reduction. This showed the epiphyseal line closed and obliterated. The femoral head was healthy; the deformity was unchanged. The index of motion was 34. In April 1945, fourteen years after reduction, a fourth roentgenogram (Fig. 3*D*) showed moderate cystic changes in the head and the acetabular roof. The joint space was thinned superiorly. The

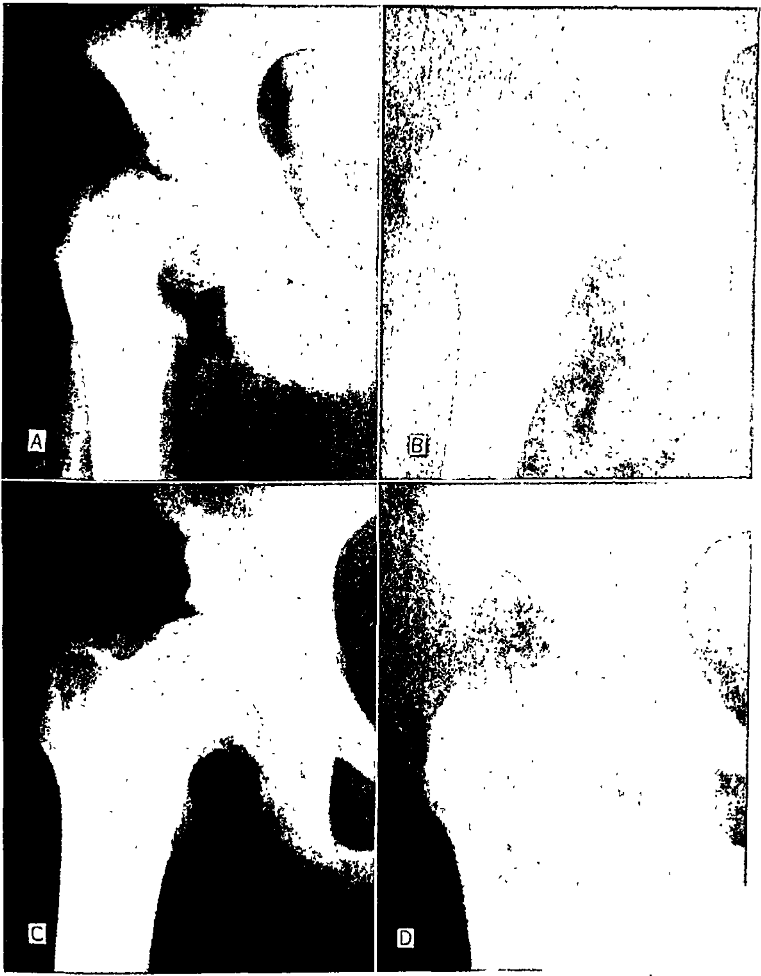

Fig. 3 (Case 3).—Strong traction and plaster immobilization. See text for explanation.

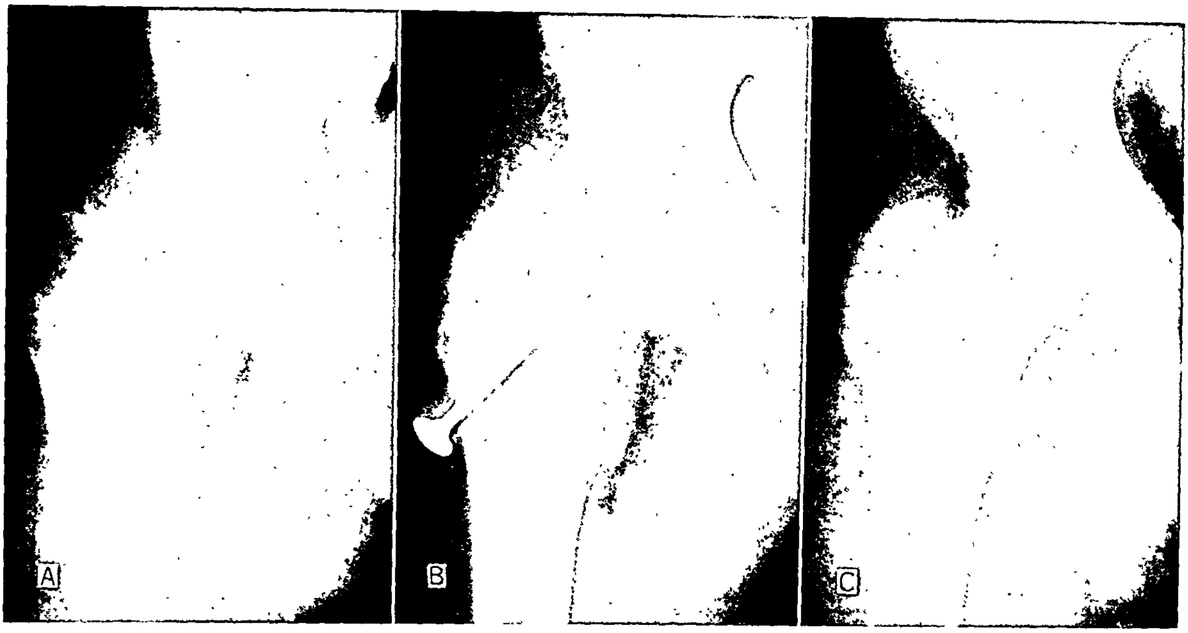

Fig. 6 (Case 6).—Open reduction and nailing. See text for explanation.

terior displacement remained, owing to the old callus. The nail was well placed, and the epiphyseal line was healing. A third film (Fig. 4*C*), taken on June 18, five months after reduction, showed the epiphyseal line healed and closed and the head healthy. In April 1945, four and a half years after reduction, a fourth roentgenogram (Fig. 4*D, E*) showed the epiphyseal line obliterated, the head healthy and the joint space normal. The nail had been removed. There were slight residual deformity and moderate lipping at the posterior margin. The patient had no pain and no limp and was working as a messenger. The index of motion was 95.

CASE 5.—A youth aged 17, whose symptoms had been present for six months and whose index of motion was 48, was treated by open reduction with plaster immobilization. The femoral head was separated from the neck at operation. A fair anatomic and clinical result, average for this type of treatment, was obtained. A roentgenogram (Fig. 5*A*) taken on October 3, 1932, showed the femoral head displaced downward ¾ inch (1.9 cm.) and posteriorly ½ inch (1.2 cm.). The shaft was in external rotation. The epiphyseal line was wide, irregular and decalcified, but healing. A mature callus was present in the inferior angle. The joint space was normal. Open reducton was performed on October 31, and a double plaster spica was employed for three months. A second film (Fig. 5*B*), taken on April 22, 1933, six months after the operation, showed the femoral head well reduced into slight valgus. The epiphyseal line had healed and closed. There was slight decalcification of the head. The joint space was thin. A third film (Fig. 5*C*) was taken on December 27, fourteen months after the operation. This showed the epiphyseal line to be obliterated; the femoral head was flat latorally, with irregular decalcification of the lateral fourth. The joint space was very thin. A fourth film (Fig. 5*D*), taken on September 24, 1938, six years after the operation, revealed the head to be bell-shaped and well ossified. The joint space was thin. There was lipping at the margins of the head. The neck was short, and the shaft was in external rotation. Slight pain and limp remained, but the patient was active. The index of motion was 40.

CASE 6.—A boy aged 14, whose symptoms had been present for four months, was treated by open reduction, separation of the femoral head from the neck and fixation with a nail. A poor clinical and roentgenographic result was obtained because of damage to the circulation of the head. A roentgenogram (Fig. 6*A*) taken on February 20, 1940, showed the head displaced downward 1 inch (2.5 cm.) and posteriorly 1 inch (2.5 cm.). Mature callus was present inferiorly. The epiphyseal line was healed and probably closed. The joint space was normal. Open reduction with nail fixation was performed on February

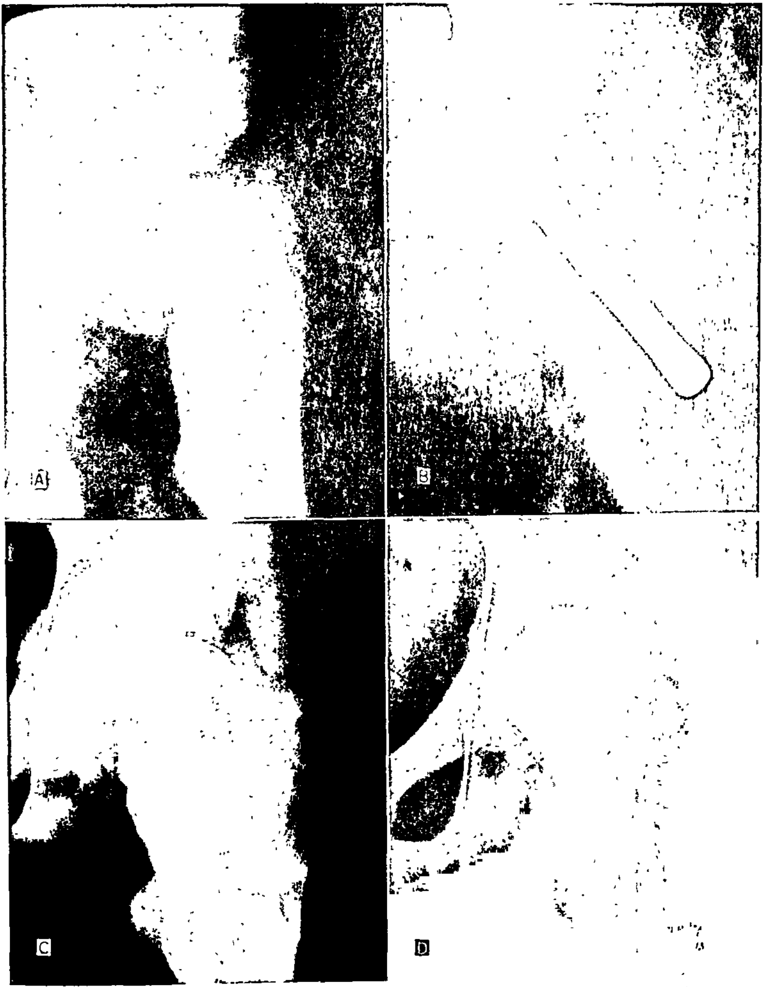

Fig. 7 (Case 7).—Open reduction with Smith-Petersen nail. See text for explanat

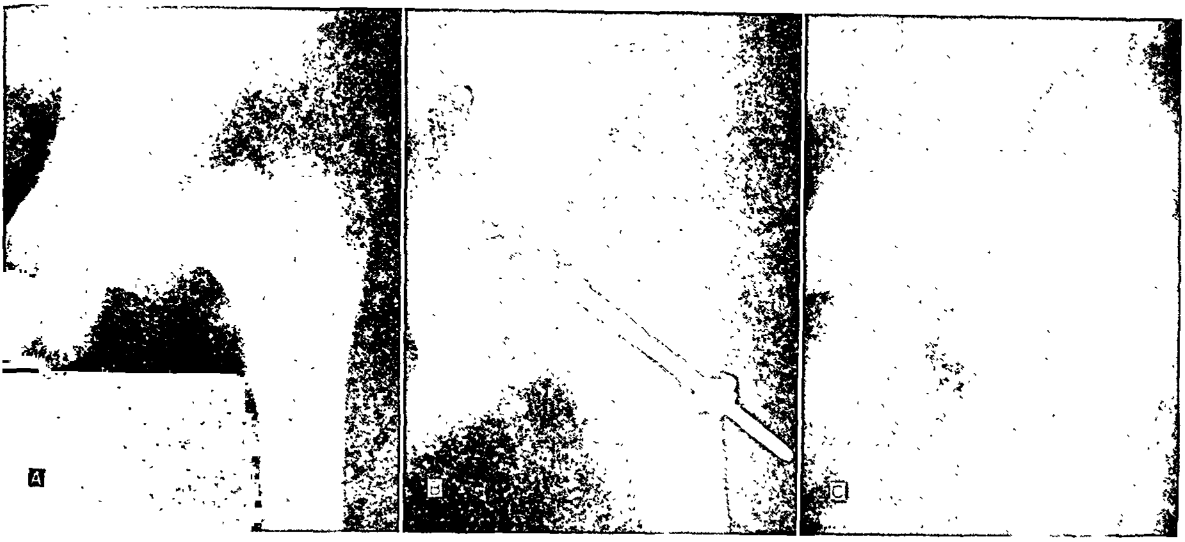

Fig. 8 (Case 8).—Open reduction and fixation with Lippman screw. See text for explanation.

28. On April 5, 1940, six weeks after the operation, a roentgenogram (Fig. 6*B*) showed good reduction in slight valgus, but there was slight downward and posterior displacement. The epiphyseal line was healing and closing. There was slight decalcification. A third film (Fig. 6*C*), taken on September 27, seven months after the operation, revealed the head to be flat superiorly and the cortex irregular. There was irregular decalcification. The joint space was very thin. Pain, limp and disability were present. The index of motion was 17. A hip fusion operation was performed in October 1941.

Case 7.—In this case open reduction and fixation with a Smith-Petersen nail were employed. The patient was a youth aged 17. Symptoms had been present for nine months. The index of motion was 45. A poor result was obtained clinically and roentgenographically, with early degenerative changes. A roentgen film (Fig. 7*A*) taken on December 2, 1940, disclosed the femoral head displaced downward ¾ inch (1.9 cm.) and posteriorly to the same extent. There was mature callus in the inferior angle; the superior angle of the neck was rounded. The epiphyseal line was wide and irregular, but healing and partially united. Open reduction with Smith-Petersen fixation was performed on December 2. A film (Fig. 7*B*) was taken on December 9, one week later. The head was in valgus but displaced posteriorly; the shaft was rotated externally. The nail was well centered but entered the acetabulum. A third film (Fig. 7*C*), taken on April 4, 1941, four months after the operation, with the nail removed, showed the head flat superiorly, with an area of degeneration and decalcification suggestive of osteochondritis dissecans. The epiphyseal line was healed and closed. The joint space was very thin. Roentgenogram 7*D*, was taken on March 19, 1948, seven years after the operation. The head was wedge-shaped and showed degenerative changes. The epiphyseal line was obliterated and the joint space very thin. There was slight lipping of the acetabular margin.

Case 8.—Open reduction, separation of the femoral head from the neck and fixation with a Lippman screw were employed in the treatment of a boy aged 13. The result, clinical and roentgenographic, was fair. There was early osteoarthritis. Acute symptoms had been present for four days. The index of motion was 21. A roentgenogram (Fig. 8*A*) taken on August 14, 1936, revealed the head to be displaced downward ¾ inch (1.9 cm.) and posteriorly ¼ inch (0.6 cm.). The epiphyseal line was wide and irregular. Mature callus filled part of the inferior angle and appeared to be a part of the neck, but there had been a further, very recent slip. The joint space was normal. Open reduction and fixation with a Lippman screw were performed on August 21. A second film (Fig. 8*B*) was taken on October 3, six weeks after the operation. The head was well reduced, with the screw well centered and secure. There was slight decalcification. The joint space was normal. The screw was removed two days later. A third film (Fig. 8*C*), taken on September 20,

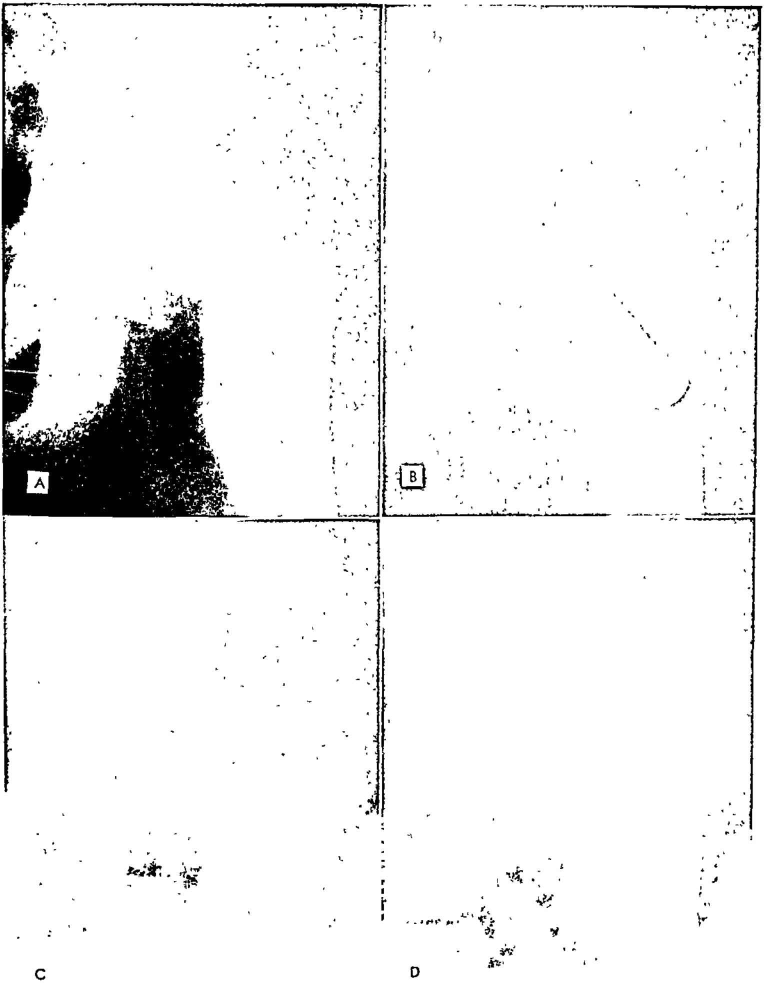

Fig. 9 (Case 9).—Wedge osteotomy of femoral neck; fixation with Smith-Petersen nail. Se explanation.

1939, three years after the operation, showed the head solidly united and the epiphyseal line obliterated. The head was bell-shaped and irregularly ossified, with marginal lipping. The head was subluxated laterally.

CASE 9.—In this case wedge osteotomy of the femoral neck and fixation with a Smith-Petersen nail were employed. The circulation was preserved posteriorly. A fairly good initial anatomic and clinical result was obtained, followed by aseptic necrosis and a poor clinical result, not uncommon with this type of treatment. The patient was a boy aged 14, with symptoms of six months' duration. The index of motion was 50. A film taken on April 7, 1949 (Fig. 9*A*), showed the head displaced downward and posteriorly ⅝ inch (1.6 cm.). The epiphyseal line was wide, with irregular decalcification. Zones of callus indicated an older slip and a fresh one. The joint space was normal. Wedge osteotomy of the neck was performed on April 8, the posterior attachment and circulation being preserved. Fixation with a Smith-Petersen nail was then done, and motion was started promptly. Another film (Fig. 9*B*), taken on June 24, ten weeks after the operation, showed a moderately good reduction. One corner of the nail entered the articular cartilage of the head. The epiphyseal line had healed and was closing. The head appeared healthy. Six months after the operation, on September 24, a third film (Fig. 9*C*) showed the epiphyseal line to be closed. There were degenerative changes in the head, especially at its juncture with the neck superiorly. The joint space was thin. The index of motion was 40. Pain, limp and moderate disability were present. On October 9, 1950, eighteen months after the operation, a fourth roentgenogram (Fig. 9*D*) showed the epiphyseal line obliterated. The degenerative changes were healing, with moderate residual deformity. The index of motion was 30. The pain, limp and disability had increased.

CASE 10.—Subtrochanteric osteotomy, with plaster immobilization, was employed in this case. The coxa vara was improved and abduction and internal rotation increased, but a new deformity occurred at the site of osteotomy. The patient was a boy aged 15, with symptoms of two years' duration. The index of motion was 70. A roentgenogram (Fig. 10*A*) taken on November 6, 1926, showed downward and posterior displacement of the femoral head to the extent of ½ inch (1.2 cm.), with mature callus in the inferior angle. The epiphyseal line was wide and irregular but healing. The abrupt superior corner of the neck had been absorbed, as usual. The head appeared healthy. Subtrochanteric osteotomy was performed on May 10, 1927, with immobilization in a double plaster spica, the lower fragment being abducted and internally rotated. On March 12 a second film (Fig. 10*B*) demonstrated the position of the fragments in the cast. A third film was taken in May 1930, three years after the osteotomy (Fig. 10*C*). The upper fragment had flexed,

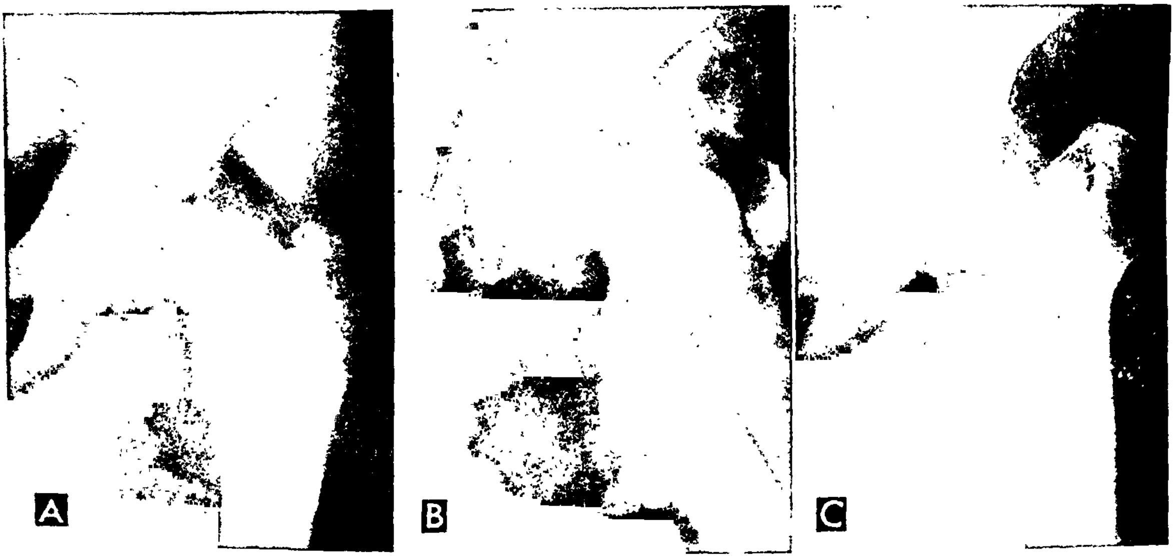

Fig. 10 (Case 10).—Subtrochanteric osteotomy; plaster immobilization. See text for explanation.

but there was solid union, with reduction of the varus and an increase in abduction and internal rotation. The epiphyseal line was closed. The head was healthy and the joint space normal. There was slight marginal lipping.

In the remaining 4 cases, pegging operations (Fig. 11) were employed, demonstrating, in each instance, the value of such procedures:

CASE 11.—In Case 11 a pegging operation was employed for a slight slip, giving an excellent clinical and roentgenographic result, with no degenerative changes — the usual result of this operation. The patient was a boy aged 12, with symptoms of seven weeks' duration. The index of motion was 80. Films (Fig. 12, *A* and *B*) taken on July 25, 1946, showed slight posterior displacement. The epiphyseal line was wide and irregular, with distal decalcification. The pegging operation was performed on August 26. Films taken on October 21 (Fig. 12, *C* and *D*), two months after the operation, showed the epiphyseal line healed and closed, the femoral head healthy and the pegs in the process of being absorbed. On February 25, 1947, six months after the operation, another film (Fig. 12*E*) showed the epiphyseal line healed and closed, the head still healthy and the pegs continuing to be absorbed. There was no pain, limp or disability. The index of motion was 100.

CASE 12.—In this case, a bilateral pre-slip pegging operation was done. The clinical and roentgenographic result was excellent, with no degenerative changes. The patient had had pain and a limp for two weeks. Films of the left hip (Fig. 13, *A* and *B*) were taken on April 28, 1942. The epiphyseal line was wide and irregular, with decalcification on the distal side. The capsule was swollen. There was no displacement. The pegging operation was performed on May 27. Seven weeks later, on July 17, additional films (Fig. 13, *C* and *D*) showed the epiphyseal line healed and closing. The pegs were being absorbed, and the head was healthy. Two roentgenograms (Fig. 13, *E* and *F*), taken on March 6, 1944, two years after the operation, showed the epiphyseal line obliterated and the pegs incorporated. The head and neck were healthy. There was no displacement. No symptoms remained. The index of motion was 90.

CASE 13.—A bone pegging operation with no immobilization in this case yielded a very good clinical and roentgenographic result despite slight slipping. The patient, a boy aged 15, had had symptoms for seven months. The index of motion was 75. Roentgenograms (Fig. 14, *A* and *B*) taken on February 21, 1947, showed the femoral head displaced downward ¼ inch (0.6 cm.) and posteriorly ⅛ inch (0.3 cm.). The epiphyseal line was wide and irregular. Mature callus was present in the posterior and inferior angles. The head was healthy and the joint space normal. On March 11 three bone pegs were placed across the epiphyseal plate, with no immobilization. Hip motions were begun on the second day. A second set of films (Fig. 14, *C* and *D*), taken on May 10, two months after the operation, showed the epiphyseal line healed and closed, with no further displacement. The head was healthy and [illegible] space normal. On May 22, 1948, [illegible] months after the [illegible]

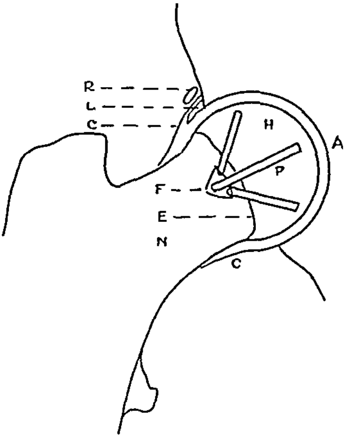

Fig. 11.—Diagram of pegging operation. *A*, acetabulum; *H*, femoral head; *N*, femoral neck; *E*, epiphyseal plate; *R*, rectus tendon; *L*, labrum glenoidale; *C*, capsule; *F*, triangular fenestration in neck near epiphyseal juncture; *P*, three bone pegs inserted across epiphyseal plate into femoral head. The pegging causes the lesion to heal with bony union of the epiphysis to the neck. (*From Howorth, B.: Slipping of the Upper Femoral Epiphysis, Instructional Course Lectures, American Academy of Orthopedic Surgeons. Ann Arbor, Mich.: J. W. Edwards Co., 1951 vol. 8*).

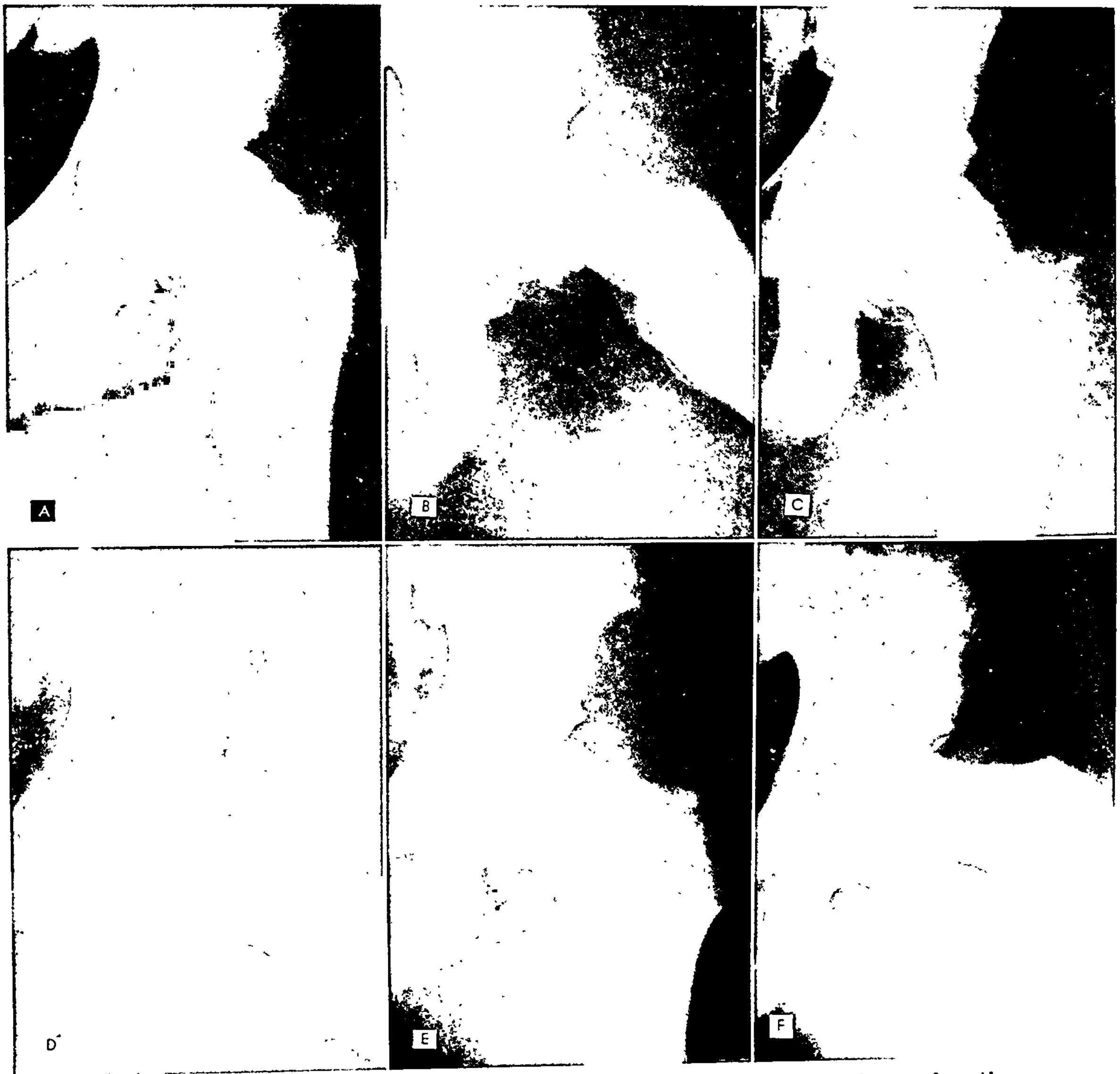

Fig. 14 (Case 13).—Pegging operation; no immobilization. See text for explanation.

results, symptomatic, physical and roentgenographic.

Statistical studies of the patients treated at the New York Orthopedic Hospital through 1946 and of my private cases have been reported, and details of the methods of study were given. Various methods of treatment were used. Since that time more than 50 additional patients have been treated. At this time the basic principles involved in the various forms of treatment will be discussed.

Slipping of the upper femoral epiphysis may be treated successfully by bed rest alone, with free motion but no weight bearing. Slipping occurred in 1 such case, however, when the youngster wrestled with his brother in bed. Slipping occurred in another such patient when she was allowed up after six months in bed. The period of healing is long with simple bed rest, especially with a young child or early in the course of the disease. Traction may be useful, with or without suspension, in relieving muscle spasm and pain during an acute phase. Prolonged traction is not necessary or advisable, especially if there is much interference with motion. Immo-

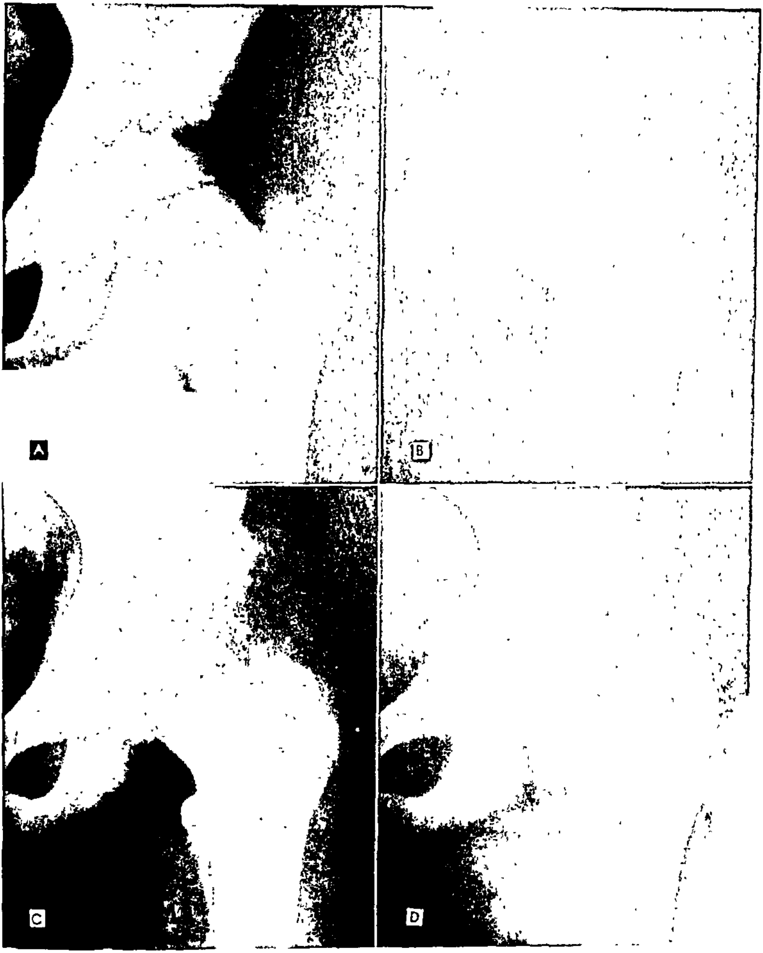

Fig. 15 (Case 14).—Pre-slip pegging operation. See text for explanation.

bilization in a plaster cast or other apparatus is likely to result in permanent reduction of the range of motion. During the period of bed rest, particularly at the beginning, the hip should be flexed at least a few degrees in order to prevent tension or pressure on the blood vessels of the neck. Motion is desirable for the healing hip, but weight bearing, even in the kneeling position, is bad.

It is sometimes possible to allow the child with a healing slipped epiphysis to be ambulant without weight bearing. This may be accomplished by using an ankle sling from a Sam Browne type of belt, or a long leg brace with the leg dangling and the opposite shoe built up to prevent weight bearing. No other type of brace really prevents weight bearing or is safe for this purpose. The difficulty with the ambulant type of treatment is that few children can be depended upon for complete avoidance of weight bearing. One patient was allowed only to go to the bathroom with crutches, but within the first week slipped and caused a marked displacement of the epiphysis.

Treatment without weight bearing should be continued until all pain and spasm have subsided, even at the extremes of motion, and until the roentgenogram reveals complete healing of the lesion. This type of treatment is most suitable for older children, those near the age for epiphyseal closure, and for those with healing in an advanced stage.

Closed reduction of a slipped epiphysis has often been attempted but is rarely successful. The common method was similar to the Whitman method for fracture of the neck of the femur, internal rotation and abduction of the hip. The Leadbetter maneuver, traction in flexion, has been less used but seems more suitable. Strong traction has been used with more immediate success, but with aseptic necrosis as a much more frequent complication. When the reduction is attempted after a fresh primary slip it can usually be accomplished with little difficulty and with minimal trauma. The difficulty is that in most cases there is callus in the inferior angle between the head and neck from previous slipping, and this callus seriously interferes with or defies closed reduction. Furthermore, control of the capital epiphysis cannot be obtained except by pulling it against the acetabular margin or the capsule, and strong traction against the capsule is likely to cause vascular damage. After closed manipulation, if the hip is held in internal rotation for the roentgenogram, the surgeon is easily deceived, whereas when a later roentgenogram is made the lack of reduction is evident. Similarly, one should not be misled by the maturing callus in the inferior angle and the smoothing off of the jog of the neck superiorly by absorption. Closed reduction is suitable only for the fresh slip with no callus and should be performed without trauma.

When a successful reduction has been accomplished by closed reduction, how should the hip be protected from slipping again? It may be suspended and traction applied, but constant and meticulous care of the apparatus is necessary, and the period of healing is likely to be many months. The hip may be immobilized in a plaster spica, internal rotation and abduction being the best position for maintenance of the reduction; but this is the worst position for the vascular supply to the head, and much of the motion is permanently lost. The best method, when it can be accomplished without damage to the hip, is internal fixation with threaded wires, a nail, or a screw. Wires are usually less likely to damage the hip, and three well placed wires should be effective in preventing further slipping. A nail or screw should be well anchored in the head, but should not penetrate it and should be inserted only once. Penetration of the femoral head or the acetabulum, or insertion of the nail or screw more than once is likely to result in aseptic necrosis of the femoral head. After a fresh slip is reduced there is a marked tendency for the capital epiphysis to slip off again when an attempt is made to engage it with the wires, a nail or a screw. With secure internal fixation, early weight bearing may be permitted, but I prefer to delay weight bearing until the lesion has healed and the epiphyseal plate is closing. In the meantime the inflammatory reaction, with pain and spasm, has subsided.

Open reduction of the slipped epiphysis can be accomplished by the surgeon experienced in surgical treatment of the hip joint. Before the lesion heals it may be easy to slip the epiphysis back in place, but it is usually necessary first to remove the callus in the inferior angle of the femoral neck. The difficulty with this method is that, when the epiphysis has slipped much, it is necessary to separate the head from the neck in order to reduce it completely. This separation destroys the blood supply to the capital epiphysis and frequently results in aseptic necrosis, often severe. The same principles apply to osteotomy through the femoral neck adjacent to the epiphyseal plate. Most orthopedists who have attempted open reduction or osteotomy of the femoral neck have given up the procedure because of the high incidence of aseptic necrosis and poor results. Several have recently revived the procedure, stressing their efforts to reduce damage to the blood supply. In some of their cases, however, aseptic necrosis has occurred; in others, arthritic lipping. In some there was only a minimal slip that did not require reduction, and in some reduction was incomplete. Open reduction, whether combined with plaster immobilization or internal fixation, is likely to be followed by a result worse than would be produced by nature herself or by a simpler and safer form of treatment, and should therefore be eliminated.

The deformity associated with slipping of the upper femoral epiphysis, resulting in external rotation of the lower extremity with limited abduction, may be corrected indirectly by subtrochanteric osteotomy. Such an osteotomy does not carry with it the danger of aseptic necrosis of the femoral head and is technically simpler to do than osteotomy of the femoral neck. However, it is not easy to maintain proper position of the fragments after the osteotomy. Immobilization in a plaster cast with the hip extended is usually followed by flexion of the upper fragment, due to psoas muscle pull, and angulation. Internal fixation with a blade plate, nail plate, or similar combination, when properly applied, is more effective in maintaining proper position. Furthermore, internal fixation of the fragments with motion of the hip is less likely to result in stiffness at the joint than is plaster immobilization. It is preferable, if possible, to postpone the osteotomy until pain and spasm have subsided and the lesion has healed. When there is only an external rotation deformity, with no restriction of abduction, such as occurs with a simple posterior slip, the leg may be brought forward by a supracondylar femoral osteotomy, which is even simpler and easier to control than is the subtrochanteric.

The best results are obtained when slipping of the upper femoral epiphysis is recognized early and further slipping prevented. The latter may be accomplished by internal fixation or by exeresis. Internal fixation has the advantage of simplicity, especially if done "blindly" through a small incision, but carries the disadvantage of risk of damage to the capital epiphysis, with aseptic necrosis. Further, internal fixation does not produce as rapid healing of the lesion and closure of the line as does exeresis. The bone-pegging operation, in a series of more than 200 cases, has been almost uniformly successful. The operation failed in 3 hips because the pegs did not cross the epiphyseal plate, and in 1 very young hip because the pegs were absorbed. The operation was repeated with success in all 4 cases. The slipping was less than ¼ inch (0.6 cm.) in about half the hips, and the final range of motion was excellent; the patients had no residual pain, limp or disability, even for athletics. The remainder had a displacement of ½ to ¾ inch (1.2 to 1.9 cm.), and the range of motion, especially internal rotation, was restricted in proportion to the deformity. Similarly, a slight limp and slight restriction were associated with vigorous athletics, but usually no pain. Many of these patients have been followed for more than ten years, the average period being seven years. In no case in which this operation was used has there been any evidence of aseptic necrosis, even by the strictest standards. Osteoarthritic lipping has occurred in only a small percentage, those with maximum slipping. In no instance has it been necessary to consider a fusion operation or arthroplasty. This is in marked contrast with the other groups.

The pegging operation is done through a Smith-Petersen incision. The capsule is incised anteriorly and superiorly close to and parallel with the rectus tendon. The vascular supply of the hip must be safeguarded, and with this incision in the capsule there is minimal bleeding. The juncture of the femoral head and neck is located anteriorly, and a triangular fenestration, about ⅜ inch (0.8 cm.) across, is made just distal to the junction. Through this opening three holes are drilled with a Nicola gouge and cleaned with a curet. The holes cross the epiphyseal plate like a tripod. Bone pegs, each about 1¼ inches (3.1 cm.) long and ¼ inch (0.6 cm.) wide, are cut from the anterior and lateral portion of the wing of the ilium, and a peg is inserted in each hole. If there is any oozing, the hole is closed with a bit of muscle. The position of the holes may be checked roentgenographically, with wires in the holes if there is any doubt. No immobilization is used after the operation unless there is an external rotation deformity, when a plaster boot with a bar may be used to hold the knee forward. Supported motion is begun the day after operation, free motion a few days later. The child is kept in bed for ten or twelve weeks, depending upon the age, the state of the epiphyseal plate, and the roentgenographic appearance at this time. He is then allowed up on crutches, with progressive weight bearing for about two weeks, then progressive activity for a month, after which he is able to return to full activity, including sports. The lesion is usually healed within three months after operation; the epiphyseal plate is usually closed within six months, and the epiphyseal line is obliterated within one year. In no case did further slipping occur after the operation.

The most important factor in the treatment is early diagnosis, which means the education of the general practitioner, the pediatrician, the surgeon, and the roentgenologist as well as the orthopedist. The badly slipped epiphysis may sometimes be reduced by closed operation and always by open operation or osteotomy of the femoral neck, but the risk of aseptic necrosis and permanent damage to the hip is great.* The few exceptions do not justify this risk. With early diagnosis, further slipping may be prevented by the avoidance of weight bearing until the lesion heals, or by internal fixation of the epiphysis, which carries some risk. However, for the orthopedist experienced in surgical treatment of the hip, the simplest and safest procedure, with the shortest healing time, is the bone-pegging operation, or exeresis of the epiphyseal plate. The results from this procedure have been excellent, and there has been no aseptic necrosis.

SUMMARY

Slipping of the upper femoral epiphysis, which is due to softening and hypervascularity at the juncture of the capital epiphyseal plate and the femoral neck, is discussed in some detail. The results of treatment depend upon the stage of disease, the methods employed and the manner of evaluating the resultant improvement or nonimprovement. The best results are obtained when the lesion is recognized early and further slipping prevented, by internal fixation or by exeresis. For the latter, the author recommends the bone-pegging procedure, which in a series of 200 cases has been almost uniformly successful.

The most important factor in the treatment of this condition is early diagnosis, the attainment of which necessitates alertness and knowledge not confined to the orthopedist but required by the general practitioner, the surgeon, the pediatrician and the roentgenologist as well.

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*The deformity may be corrected more easily and more safely by subtrochanteric or supracondylar osteotomy.

RÉSUMÉ

Le glissement de l'épiphyse supérieure du fémur, secondaire au ramollissement et à l'hypermusculature de la tête épiphyséale est discuté en détails par l'auteur. Les résultats thérapeutiques dépendent du stage de la maladie, procédé employé et de la façon d'évaluer le progrès. Les meilleurs résultats s'obtiennent si le diagnostic et le traitement furent précoces. L'auteur recommande un procédé particulier qui a bien réussi chez 200 cas.

ZUSAMMENFASSUNG

Das Abgleiten der oberen Femurepiphyse, das auf einer Erweichung und übermässiger Muskelentwicklung an der Verbindungsstelle zwischen der Epiphysenplatte des Femurkopfes und dem Oberschenkelhals beruht, wird recht ausgiebig erörtert. Die Behandlungserfolge sind abhängig vom Stadium der Erkrankung, von den angewandten Behandlungsmethoden und von der Auswertung der erzielten oder ausbleibenden Besserung. Die besten Resultate werden erreicht, wenn die Erkrankung frühzeitig erkannt und ein weiteres Abgleiten durch innere Fixierung oder Resektion verhütet wird. Um dies zu erreichen, empfiehlt der Verfasser die Knochennagelung, deren er sich in einer Serie von zweihundert Fällen mit fast gleichförmig guten Erfolgen bedient hat.

Die grösste Rolle in der Behandlung dieser Erkrankung spielt die frühzeitige Diagnose; dazu bedarf es der Aufmerksamkeit und Erfahrung nicht nur des Orthopäden sondern auch des praktischen Arztes, des Chirurgen, des Kinderarztes und des Röntgenologen.

RESUMEN

El deslizamiento de la epifisis superior del femoral, que se debe a ablandamiento y al aumento del factor muscular en la unión de la placa epifisiaria y el cuello femoral, se discute en detalle, así como los resultados del tratamiento dependientes del estadio de la enfermedad, los metodos empleados y la manera de valorizar la mejoría ó no mejoría resultante. Los mejores resultados se obtienen cuando la lesión se reconoce tempranamente y se previene un deslizamiento posterior por medio de la fijación interna ó exeresis. Para esta última, el autor recomienda el procedimiento de enclavijamiento óseo, el que en una serie de 200 casos ha tenido éxito casi uniformemente.

El factor más importante en el tratamiento de este padecimiento es el diagnóstico temprano, lo cual requiere para lograrse estar alterta y tener conocimiento no del ortopedista sino del médico general, el cirujano, el pediatra y el radiólogo.

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Problems Encountered in Fenestration

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CHICAGO, ILLINOIS

ONE of the spectacular achievements of modern surgery is the restoration of useful hearing to the chronically deaf by means of the fenestration operation. Before this procedure could be accepted as the treatment of choice for otosclerosis, a number of surgical problems had to be solved. The solutions arrived at can have practical applications to other types of surgery.

The principle of the fenestration operation is simple: it restores hearing by creating a new sound pathway into the labyrinth to take the place of the oval window which has been occluded by the otosclerotic process. The initial attempts to do this began nearly sixty years ago and continued sporadically during the next thirty years, but invariably failed: either the labyrinth became infected, with prompt loss of all hearing and grave risk of fatal meningitis, or osteogenic repair soon closed the new window, with loss of the hearing improvement.

The solution to the problem of suppurative labyrinthitis was pointed out by Holmgren of Sweden, who demonstrated that the labyrinth could be opened safely with a careful sterile surgical technic. In recent years chemotherapy and antibiotic therapy have strengthened the otologist's hand, but it must be reemphasized that these are not substitutes for a good aseptic technic. They are to be regarded only as reinforcements for the most careful and painstaking meticulous sterile technic in the operating room and in the postoperative dressings, for which there is no substitute. My own record of 3,425 consecutive fenestration operations performed at Wesley Hospital of Northwestern University during the last fifteen years, without a fatality or a single serious postoperative complication due to infection, attests to the effectiveness of good sterile technic in this procedure.

A much more stubborn problem was that of osteogenic closure of the new window. Despite many variations in technic, some of them ingenious, the fenestra, in many cases, persisted in closing after a few months or a year. A tiny metal frame fitted to the margins of the window failed to block closure; a cartilage stopple placed in the window became fixed and invaded by bone; chemicals, cauteries, roentgen rays and lead applied to the bone around the fenestra all failed to give the answer. With all this discouragement, it is remarkable indeed that the solution to this problem has finally been found, so that today osteogenic closure causes the hearing improvement to be lost in not more than 1 or 2 per cent of patients who have undergone the operation.

The credit for the present success of the fenestration operation must go to our friends the experimental animals. The problem was first attacked in animal experiments by Holmgren and his associates nearly twenty years ago. The experimental studies were resumed at Northwestern University in 1940 and soon after at several other centers. Rhesus monkeys were mainly used because their ears are so much like man's, in all respects except size, that variations in technic could be translated directly from the experimental animal to the human being. From these studies six factors have been found to influence osteogenesis at the fenestra. I do not claim priority for discovering the factors that stimulate or inhibit osteogenic repair. Most of them were known before, but their application to the fenestration operation required the clearcut demonstration afforded by the animal experiment.

Possibly the most important cause of

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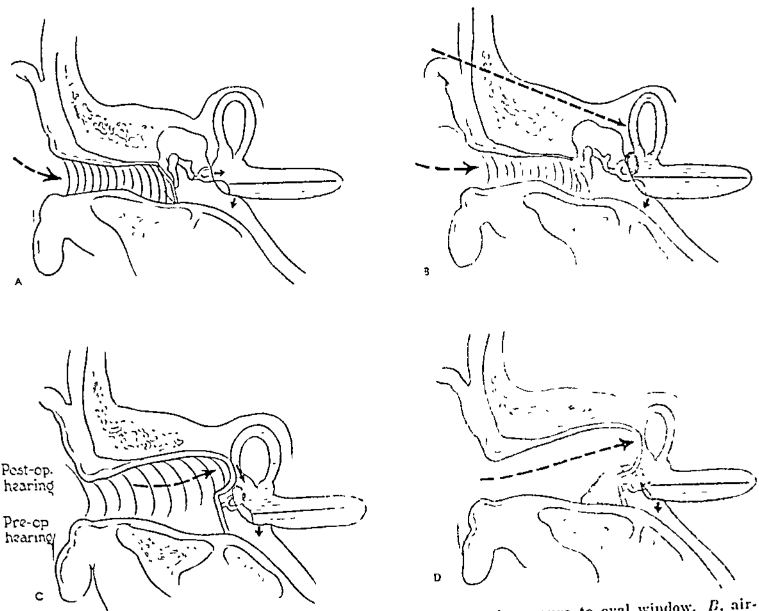

Fig. 1.—*A*, lever mechanism of normal ear brings greater sound pressure to oval window. *B*, air-borne sound blocked by otosclerosis. Bone conduction remains normal. *C*, air-borne sound enters labyrinth through new fenestra. *D*, differential sound pressure between fenestra and round window increased by ointment against tympanic membrane.

closure of the fenestra in the early days was the stimulating effect of bone particles on osteogenesis. I was able to show that even a single microscopic speck of bone dust in the mouth of the fenestra can lead to osteogenic narrowing of the window. The first requisite in keeping the fenestra open is the meticulous removal of every particle of bone from around it. Two technical advances have been particularly helpful: a continuous flow of sterile Ringer's solution across the field while the fenestra is being made with a fine dental burr insures that every particle of fine bone dust is washed away before it can settle in the fenestra or on the surrounding bone; an operating microscope further aids in the detection and removal of microscopic bone particles. With the introduction of these technics in 1940, the incidence of closure in my cases dropped abruptly from nearly 70 per cent to around 25 per cent. I should say there that I reintroduced the operating microscope, for it was first used by Holmgren some years earlier.

Another factor brought out by animal experiments is the different osteogenic activity of the different bone layers of the labyrinthine capsule. The outer layer of periosteal bone regenerates more rapidly and readily after trauma than does the deeper layer of dense, ivory-like
chondral bone derived from fetal ca
By wide exposure of this inactive

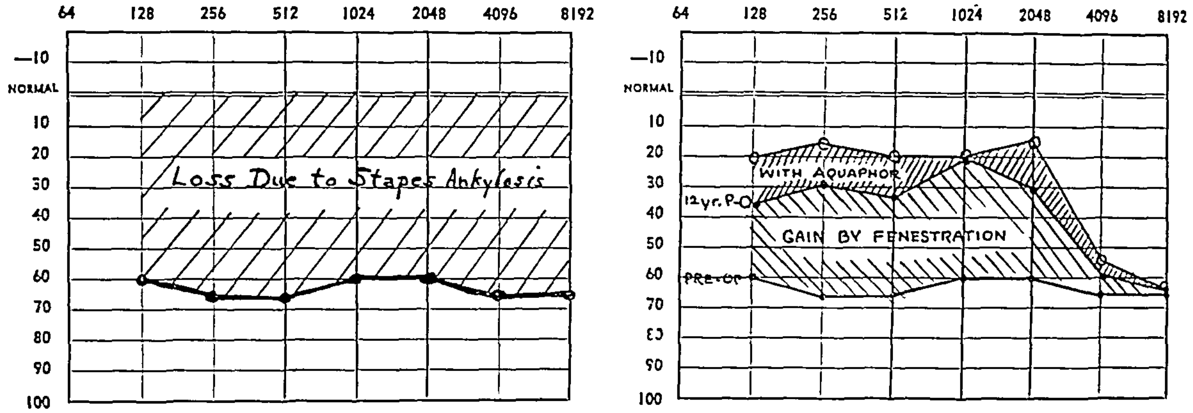

Fig. 2.—Successful fenestration of twelve and one-half years' duration, with further gain by aquaphor ointment against tympanic membrane. *Left*, preoperative audiogram. *Right*, audiogram taken twelve and one-half years after operation.

chondral bone layer the fenestra is "endochondralized." Since endochondral bone is present nowhere in the adult skeleton outside the ear, this factor is not applicable to bone surgery elsewhere.

The first permanently successful operation for otosclerosis was performed by Sourdille in France, who obtained his inspiration after seeing Holmgren's work in 1924. Sourdille covered the fenestra with a plastic flap of skin from the external auditory meatus, and it is now known from the animal experiments why this procedure succeeded for the first time, at least in some cases, in producing a permanently open window; it was because skin lying against bone tends to inhibit osteogenesis. The third requisite for a permanently patent fenestra is that it be covered by a thin skin flap that adheres closely to the fenestral margins.

The early pioneers in fenestration surgery, Sourdille and Lempert, feared that the periosteum of the skin flap elevated from the osseous external auditory meatus would induce osteogenesis. Animal experiments have demonstrated that the reverse is true. Periosteum and the endosteum that lines the labyrinth are thin, dense fibrous tissue membranes that normally act as *limiting membranes*, actually tending to inhibit and limit new bone formation. If periosteum or endosteum is stripped from the underlying bone the denuded bone surface begins to proliferate, exactly as the subcutaneous connective tissue begins to form granulations when the overlying skin is removed or destroyed. The osteogenic inhibiting property of intact periosteum and endosteum is taken advantage of by creating a fenestra with intact endosteum up to its knifelike edge, so that this endosteum will unite with the periosteum of the skin flap, with "healing by first intention" of the cut bone surface. Just as careful approximation of skin edges results in "healing by first intention" with a minimum of scar, so approximation of the endosteum and the periosteum at the edges of the fenestra minimizes callus from the bone.

A fifth factor that contributes toward the permanence of the fenestra is the lessened tendency of a smooth, polished bone surface, as compared with an uneven, rough surface, to produce new bone. The fenestra is finished by polishing with a smooth burnishing burr.

Finally, the animal experiments clearly showed the tendency for new bone to invade adjacent young fibrous tissue. Three causes of fibrosis after fenestration are hemorrhage, infection and a dead space between the skin flap and the bone. Shaping the contour of the bone so that the fenestra lies on top of a dome causes the skin flap to hug it tightly like a glove. After trying many types of general anesthesias, including avertin and pentothal, I have concluded that the minimal bleeding is encountered when local anesthetics are used.

The fenestra made according to these six factors that influence osteogenic repair I describe as "micro-immaculate, endochondralized, endosteum - hemmed, epidermis-periosteum gloved, burnished and free from infection or hemorrhage." If the fenestra is made according to these principles the normal stimulants to osteogenesis are never invoked, and, with rare exceptions, the fenestra does remain permanently open, with a maintained improvement in hearing.

The mechanics of the fenestrated ear are interesting. The labyrinth of the normal ear has two inches at either end of the cochlear duct: the oval and the round window. To excite the auditory nerve endings, the fluid in the cochlea must be set into vibration. Sound can enter the labyrinth through either window, but normally it reaches the oval window with much greater force, owing to the lever effect of the tympanic membrane and the ossicular chain and to the fact that the intact tympanic membrane offers partial obstruction to sound reaching the round window (Fig. 1*A*). Thus, in the normal ear there is a large differential in the sound pressure at the two windows, and it is this differential that causes the vibratory movements of the fluid in the cochlea.

In the presence of otosclerosis the oval window becomes occluded by new bone, and air-borne sound no longer reaches the cochlea (Fig. 1*B*). By bone conduction, however, sound does reach the labyrinth, and the bone-conducted hearing remains good. This, incidentally, is used for the diagnosis of otosclerosis.

After the fenestration operation, air-borne sound enters the labyrinth through the new window, but without a lever mechanism of tympanic membrane and ossicular chain (Fig. 1*C*). Therefore, the differential in sound pressure between the fenestra and the round window is not as great as in the normal ear, and as a result the successfully fenestrated patient still shows a minor hearing loss that averages 25 decibels for the speech frequencies. Recently I have observed that the differential between the new window and the round window can be increased after fenestration by placing ointment or other material against the tympanic membrane, further blocking sound from reaching the round window (Fig. 1*D*). A most gratifying 5 to 10 decibels of hearing improvement can thus be obtained for many successfully fenestrated patients (Fig. 2).

I should like to conclude by mentioning a problem that continues to haunt every surgeon, and that I have encountered in my fenestration work. During the first eight years, 4 patients in a series of 951 operations had rather mild but definite femoral phlebitis, but the last one, a nurse, had a pulmonary embolus, from which she fortunately recovered after treatment with oxygen, dicumarol and ligation of both femoral veins. I then instituted Ochsner's routine of leg and breathing exercises every half hour after every fenestration, until the patient is ambulatory. The result: only 1 case of femoral phlebitis (and none of pulmonary embolus) has occurred in 2,569 consecutive operations during the past seven years. I regard these statistics as most revealing: 4 cases of femoral phlebitis in the first 951 operations, before the leg and breathing exercises were instituted, and 1 case in 2,569 operations since the establishment of this routine.

In this discussion of some of the problems encountered and overcome in the development of today's fenestration operation, I do not wish to give the impression that every problem has been solved and that the operation gives 100 per cent perfect results. The problem of the progressive degeneration of the auditory nerve that occurs in cases of otosclerosis, though less commonly after fenestration, remains unsolved, and there are certain other problems that still await solution. Actually, today's fenestration operation offers the hard of hearing whose deafness is due to otosclerosis with stapes ankylosis approximately 7 or 8 chances in 10 of a[illegible] and maintaining a satisfactory [illegible] tion of hearing.

SUMMARY

The author discusses some of the special problems he has encountered and overcome in surgical fenestration procedures, including suppurative laryngitis, osteogenic closure of the new fenestra, etc. Not every problem has been solved, nor does the operation always yield perfect results, but the modern fenestration procedure offers to patients with hearing difficulties due to otosclerosis with stapes ankylosis approximately 7 or 8 chances in 10 of a satisfactory restoration of hearing.

RIASSUNTO

L'Autore discute alcuni particolari problemi da lui incontrati e superati nel praticare i vari metodi di fenestrazione chirurgica, ivi comprese la laringite suppurativa, la chiusura dell'apertura praticata mediante la fenestrazione, etc. Non tutti i problemi sono stati risolti, nè l'interventrazione offrono ai pazienti deboli di udito facenti, ma le moderne tecniche di fenesto ha costantemente dato risultati soddisin seguito ad otosclerosi approssimativamente 7 od 8 probabilità su 10 di riacquistare una soddisfacente capacità di udire.

RESUMEN

El autor discute algunos de los problemas encontrados en la fenestración quirúrgica, incluyendo la laringitis supurada, el cierre osteogéénico de la nueva ventana, etc. No se han resuelto todos los problemas, ni la operación proporciona siempre buenos resultados, pero la fenestración moderna ofrece a los pacientes con dificultades auditivas debidas a otoesclerosis con anquilosis detenida, 7 ú 8 oportunidades en 10 de restauración satisfactoria de la audición.

RÉSUMÉ

L'auteur discute de certains problèmes auxquels il a dû faire face après l'opération de fenestration tels que la laryngite suppurée et la fermeture ostéogénique de la nouvelle fenestre. Cette intervention ne peut guérir tous les patients; cependant, dans une proportion de 7 à 8 sur 10, elle donne des résultats satisfaisants à ceux qui souffrent de surdité due à une otosclérose.

ZUSAMMENFASSUNG

Der Verfasser erörtert einige der besonderen Probleme, die er im Zusammenhang mit Fensterungsoperationen angetroffen und überwunden hat; dazu gehören die eitrige Kehlkopfentzündung, der knöcherne Verschluss des neuen Fensters und anderes. Das moderne Fensterungsverfahren löst keineswegs alle Probleme und führt nicht immer zu vollkommenen Resultaten, bietet aber doch Kranken, die infolge von Otosklerose mit Steibügelverknöcherung an Schwerhörigkeit leiden, eine 70-bis 80-prozentige Aussicht auf genügende Wiederherstellung der Hörfähigkeit.

RESUMO

O autôr discute alguns dos problêmas especiais que êle encontrou nos processos cirúrgicos de fenestração. Nem todos es problêmas fioram resolvidos, e tãopouco as operações praticadas oferecem perfeitos resultados, ressalta porém que o moderno processo de fenestração oferece aos pacientes com audição dificultada pela otoesclerose, aproximadamente, 7 ou 8 oportunidades de restauração em cada 10 casos.

Recurrent Dislocation of the Shoulder

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THE shoulder, more than any other joint, is subject to recurrent dislocation. With a few exceptions the displacement occurs anteriorly and is of the subcoracoid type.

This paper is based on a review of 50 cases of recurrent anterior dislocation of the shoulder in which operation was performed according to the method of Noordenbos, and the result of a study of the world literature on all available cases from 1930 to 1952, with special attention to the roentgenologic changes of the humeral head.

The pathologic picture consists of two important elements: (1) stripping of the capsule from the anterior aspect of the glenoid and the neck of the scapula, usually associated with incomplete detachment of the glenoid labrum from the bone, as described by Bankart, and (2) a characteristic defect of the head of the humerus (Fig. 1). Adams, of London, observed detachment of the glenoid labrum and anterior stripping of the capsule in 87 per cent of 180 cases. A groove on the posterior surface medial to the tuberculum majus was observed in 82 per cent of his cases. This groove, described by such pathologists as Cramer and Broca and Hartman, is due to the trauma of the initial dislocation and is based on a compression fracture, caused by pressure of the glenoid rim medial to the tuberculum majus during the dislocation.

Hermodsson and Gauwersky pointed out that this groove can be seen in 100 per cent of all traumatic dislocations.

The groove was present:

Hermodsson	23	23	100%
Hill and Sachs	15	11	74%
Pettersson	31	19	61%
Adams	88	56	82%
Palmer	60	60	100%
Leguit	60	58	97%

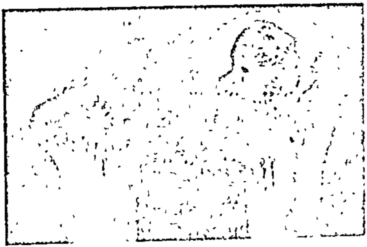

Fig. 1.—Characteristic appearance of the head of the humerus.

My 60 patients, on 50 of whom operation was performed, have been examined after the next procedure (Fig. 2).

1. *Anteroposterior Roentgenograms in Exorotation and Endorotation.*—The defect is most often demonstrated in profile, when anteroposterior radiograms are made with the humerus in 60 to 70 degrees of internal rotation. A slight individual variation has been noted in the position of the defect and consequently in the positioning required to demonstrate it roentgenographically. Because of this variation a small defect may easily be overlooked, unless several projections are made showing the head of the humerus in positions between 50 and 80 degrees of internal rotation. For this reason it is probable that the incidence of the defect has been underestimated by most observers. Except for papers by certain French authors (Julien, Solcard, Avril and Sicard), little is said about the battle-ax shape of the humeral head. This deformity "en hachette" was not mentioned Her-

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From the Surgical Department of the University Clinic, Binnengasthuis, Amsterdam.
Submitted for publication March 20, 1953.

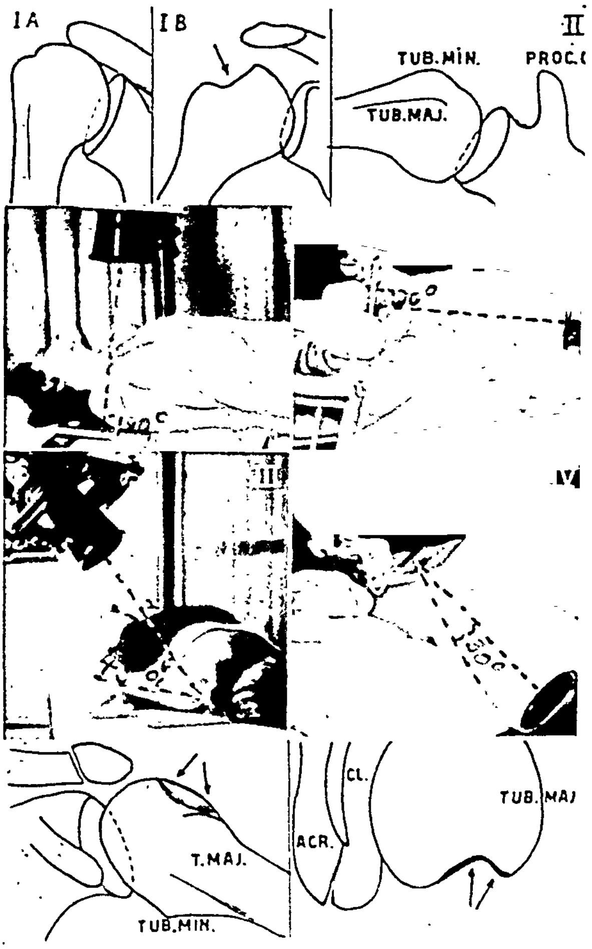

Fig. 2.—Positioning for roentgenograms.

modsson. Six of my patients (10 per cent) showed flattening of the humeral head.

2. Axillar Projection.—Alteration of the anterior border of the joint can easily be seen, as can also the deformity of the humeral head and calcifications in the subscapularis.

3. Projection of Didiée.—The projection of Didiée, described in 1929, is an oblique backward-forward projection. The patient is lying on the belly, with the shoulder flat on the table, and his head turned to the sound shoulder; the hand, with the thumb lifting, rests on the iliac crest. The elbow is raised 6 to 8 cm. by means of a cushion; the epicondylar-epitrochlear axis is in a vertical position, the anticathode being almost above the elbow in a plane that runs vertically through the humeral shaft. The vertical distance from the elbow to the anticathode has been taken in such a way, that the central ray focused on the humeral head makes an angle of 45 degrees with the horizontal plane. In this projection the detachment is visible only if the periosteum of the scapular neck has been torn loose and if there is bone formation on the anterior surface of the scapular neck. Loose bodies are but seldom encountered; they generally consist of a piece of bone, that has been detached from the lower rim of the cavity.

On the lateral side of the humerus, between the tuberculum major and the head, an excavation is bordered on the medial side by a clarification, with or without a line of condensation.

4. Projection of Hermodsson (tangential projection 1933).—The defect being a groove, it may be caught in transverse section by tangential projection, which was elaborated by Hermodsson. The direction of the rays therefore runs parallel to the longitudinal vertical axis of the groove.

The patient must be nearly in a sitting position, with the upper part of the arm in internal rotation along the body, the back of the hand resting against the spine. Thus the posterior part of the head containing the defect is turned in lateral direction and is not covered by the acromion.

The anticathode is on a level with the elbow at such a distance that the central ray, which is focused on the head, makes an angle of 30 degrees with the humeral axis. The roentgen film is placed on the shoulder at right angles with the humeral axis and as far medial as possible. As every factor can easily be made constant, a good comparison between right and left is possible. With a normal shoulder this tangential projection shows half of an elliptic head; a very shallow depression represents the anatomic neck. Dorsally to the humerus the shadow of the clavicle and of the scapular spine is vaguely visible, and if the patient is not too obese it can be seen that the head medially touches the glenoid cavity. If the upper part of the arm is held in outward rotation, the tangential roentgenogram shows the two intertubercular sulci as symmetric excavations between the greater and the lesser tuberosity.

In the presence of recurrent dislocation of the shoulder the defect is seen as an indentation in the smooth outline of the head. The bottom of the groove is sometimes tapering, sometimes flat, the depth varying from some millimeters to 1 cm. The bottom is formed by a condensed zone (line of condensation of Hill and Sacks) about 1 mm. thick. On the side of the humeral head the bottom is a sharp straight line, caused by a compression fracture. On the side of the greater tuberosity, the bottom is generally blunt and rough. The width (distance from front to rear edge) of the groove was, as measured on the roentgenograms by Hermodsson, 15 to 20 mm.; on my roentgenograms it was 20 mm. The defect is not enlarged by repeated dislocation. Hermodsson noted the presence of this groove not only in all his patients with recurrent shoulder dislocation but in 40 cases of traumatic dislocation, whereas in the roentgenograms taken in the forward-backward direction he observed a typical defect in only 24 patients.

Owing to the tangential projection, the visibility of the groove consequently rose from 60 to 82%. In the presence of traumatic dislocation the bottom of the groove is more irregular and the line of condensation less clear. This investigation also proves that the groove is not specific for recurrent dislocation. I observed the defect in 50 of 60 patients suffering from this condition. Figure 3 shows roentgenograms of a patient who had been successfully operated on fifteen years earlier (1937), with a history of 20 luxations of the left shoulder.

To render capsular tears and ruptures of the external rotators visible, Axen and

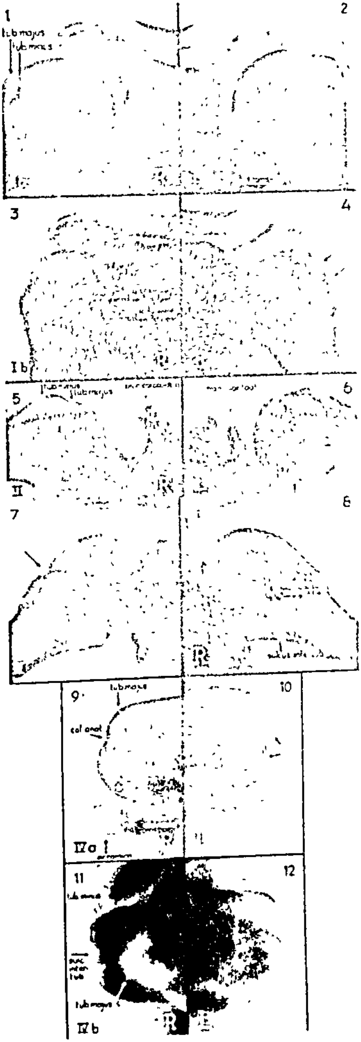

Fig. 3 (opposite).—Roentgenograms taken after author's procedure, fifteen years ago. The patient had a history of 20 luxations of the left shoulder.

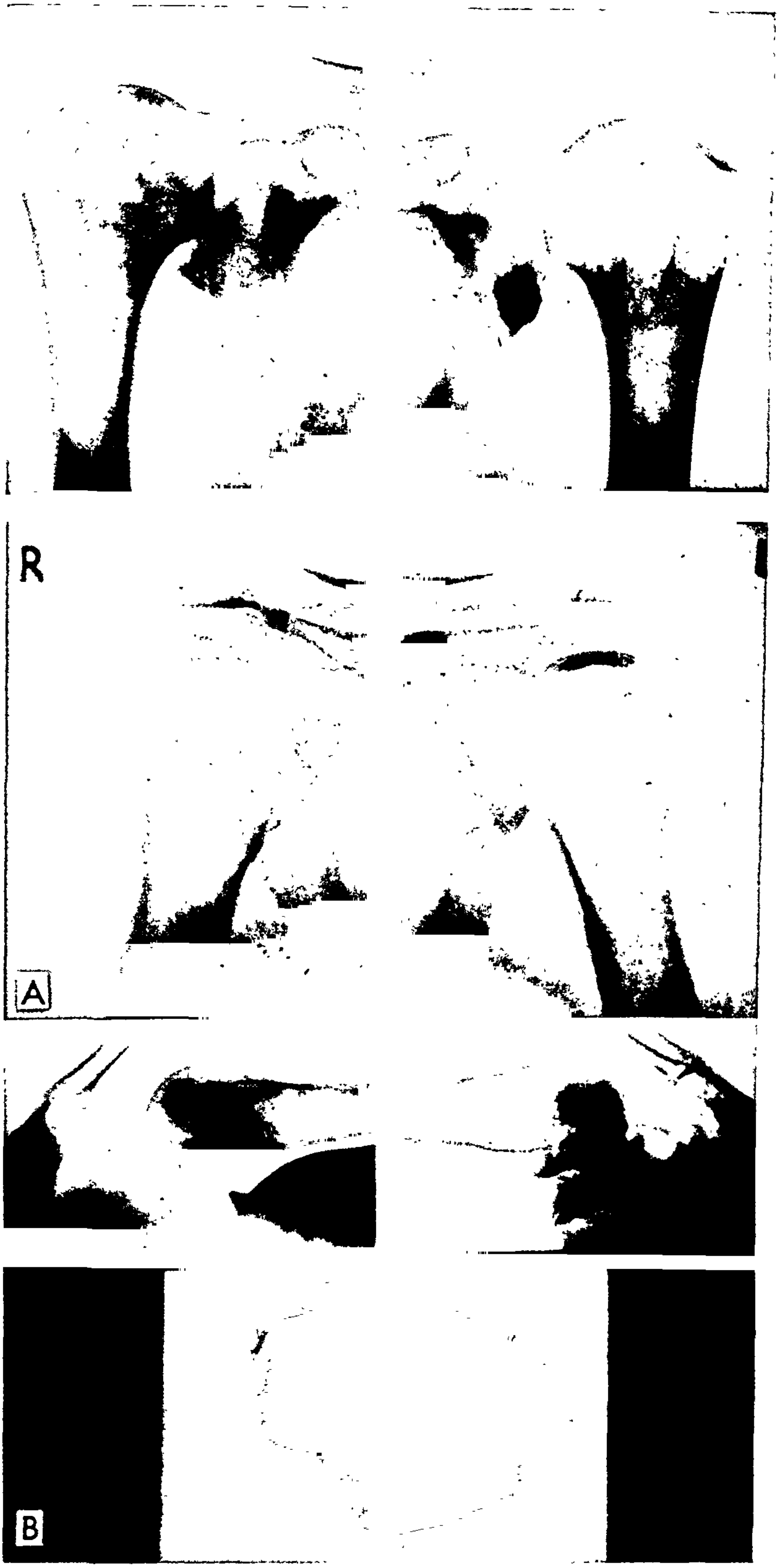

Fig. 7.—Roentgenograms of the shoulders of the patient in Figure 3, taken fifteen years after the operation.

anterior border of the glenoid under 60 degrees with the planum scapulae (See also Fig. 4). Twenty years afterwards this graft is seen in the same shape as it had ten years ago and as tightly fixed as then. The graft retains its extraarticular position permanently if placed on the right spot. It maintains its original form without fracturing; only a little absorption will occur during the years.

Eden, Hybbinette and Palmer used iliac crest; Speed used tibia grafts and Orell os purum (with bad results). I have not heard of hetereografts from the bone bank. The advantage of use of the fibula is that all surfaces are covered with periosteum and no additional fixation is necessary. All operations are performed with the patient under general anesthesia. First the transplant is taken out of the leg and then the planum scapulae is reached via the sulcus deltoideopectoralis. The "point-de-répaire" is here the processus coracoideus. Sometimes the coracobrachialis muscle and the short head of the biceps are cut from their insertions to give a better view (Fig. 5).

Stress must be laid on the following points:

1. Begin the incision while the arm is in abduction;
2. Retract the brachial plexus medially;
3. Starting from the base of the processus coracoideus along the anterior rim of the glenoid cavity, locate a point as far caudal as possible on the neck of the scapula. Drill or punch a hole at this point for the graft as the os, at an angle of 60 degrees to the planum scapulae.

A group of 50 patients has been operated upon by five surgeons, with an observation time of 2 to 20 years. There were three recurrences, all after operation by the same surgeon; the graft had been placed too far from the anterior rim, so that the former had no function. One of these patients was reoperated on five months later, at which operation I removed the graft from the wrong place and fixed it in a new hole, as near to the rim as possible. After two years the result was excellent (Fig. 6).

In connection with the follow-up, most patients spontaneously expressed their great satisfaction with the operation. There was no limitation of shoulder motion after the bone block procedure. Many of the patients are engaged in heavy manual labor and have been able to resume various recreations and sports (swimming, wrestling, boxing, tennis and golf). The percentage of successful results with the bone block method is dependent on the experience and skill of the operating surgeon. Von Hellens, who collected all cases of recurrent dislocation of the shoulder in Finland, obtained good results in 95.8 per cent ± 2.1 per cent. The operations had been performed by four surgeons with an experience of more than 15 cases each. The percentage amounted to 70.4 ± 5.4 in cases of operation by twenty-nine surgeons with an experience of less than 15 cases each.

Figure 7 is a roentgenogram of the patient mentioned in Figure 3, also fifteen years after the operation, with only a slight resorption of the graft. This man, a dock laborer, had no recurrence and no limitation of movement.

The better results of the capsule opera-

World Review of the Results of Operations

	1930-1942			1942-1952		
Methods	*Number of Cases*	*Recurrences %*		*Number of Cases*	*Recurrenc*	
Capsule	129	23	17.8	116	14	
Suspension	362	42	11.6	206	75	
Muscle	104	17	16.3	36		3
Bone Block	336	14	4.1	359		

Monocytic Leukemia: Oral and Anorectal Involvement

Report of a Case

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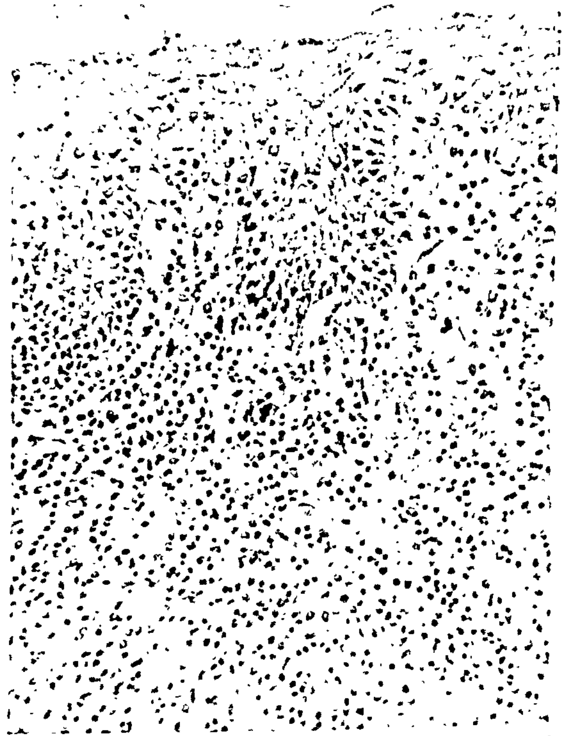
INVOLVEMENT of mucous membrane in the course of all types of leukemia is well recognized. In the monocytic form it is extremely common and is likely to be so severe as to present the source of the patient's initial complaint. Medical literature[1] and textbooks on hematology show and describe oral, pharyngeal and nasal lesions. Little has been written, however, concerning anorectal evidence of this disease. Because of the apparent rarity of such involvement in monocytic leukemia, this case is presented.

REPORT OF CASE

Mrs. J. H., aged 37, para 1, stated that in June 1947 she noticed what seemed to be a painful canker sore on the left side of the lower gum. This persisted for six weeks and was followed by a similar lesion on the opposite side of the mouth. This lasted for a month; there then appeared a painful herpetiform swelling on the back of the right shoulder. This remained for a week and left a painful pigmented scar.

By August of the same year, swallowing had become increasingly more painful and the hard palate remained tender. There were persistent fatigue and pallor. On October 27 the patient was hospitalized. At this time examination of the oral cavity showed the gingiva to be slightly swollen. The uvula was thickened and deviated to the left. The right posterior tonsillar pillar was necrotic and covered by a tenacious grey membrane. The edge of the area was ringed by an inflammatory area 1 to 2 mm. in width. Multiple nodular greyish lesions measuring 1 to 4 mm. dotted all buccal surfaces. These were painful to touch and firm in the centers. Both anterior and posterior cervical lymph nodes and the right posterior auricular nodes were shotty. The spleen was moderately enlarged, but the liver was not palpable. Sternal puncture showed a large number of small cells of leukemic type, an increase of cells of the monocytic series and an increase in reticular cells.

Variations in the blood picture following weekly transfusions of whole blood are shown in Table 1.



Anal membrane showing intact epithelium and moderately heavy infiltration of stroma by mononuclear cells.

From the Division of Proctology, Department of Surgery, Menorah Medical Center, Kansas City, Missouri.
Submitted for publication Dec. 17, 1952.

TABLE 1

Date	Hgb., %	Erythrocytes, per Cu. Mm.	Leukocytes, per Cu. Mm.	Polymophonuclears	Lymphocytes	Comment
10/27/47	52	2,360,000	16,000	4	96	
11/ 1/47	71	3,640,000	12,000	4	95	Bleeding time, 2 minutes
11/ 5/47	73	3,670,000	11,600	5	95	69% mononuclear
12/ 9/47	70	3,640,000	15,300	5		85% mononuclear
12/15/47	55	2,700,000	19,650	3		94% mononuclear
12/19/47	68	3,530,000	26,800	2		2% monoblast
12/20/47	67	3,510,000	31,900	1		99% large typical monocytes

TABLE 2

Date	Hgb., %	Erythrocytes, per Cu. Mm.	Leukocytes, per Cu. Mm.	Lymphocytes	Comments
1/17/48	40	2,225,000	66,200	2	95% atypical monocytes
2/ 5/48	30	1,700,000	13,850	5	95% atypical monocytes

Throughout this period the patient's temperature ran a septic course. The chief complaints were of increasing weakness and painful swallowing.

On December 10 the patient began to complain of constant rectal pain. Examination showed erythema and swelling of the right upper quadrant of the perianal area, simulating cryptitis and abscess formation. Digital examination was not attempted because of pain. After a week of application of hot moist packs to the parts, the inflammatory process about the anus had become more extensive. With the patient under general anesthesia, examination revealed a ring of hypertrophied papillae partially covering a grey necrotic area involving a third of the mucocutaneous juncture. This appeared to be identical with the necrotic area in the oral cavity. To permit better drainage, several crypts in the most dependent position were widely excised, together with adjacent papillae. After this operation the anal pain diminished, but there was no alteration of the septic course.

One month later the trachea and vocal cords became involved, as was evidenced by hoarseness and greater difficulty in swallowing. Several series of roentgen treatments, 100 r over the affected parts, brought rapid relief; however, the temperature soon after rose to 105 F. and remained at that level for three days. It then suddenly fell to 96.4 F. and continued septic.

The left tonsil by this time had also become involved in the necrotic membranous process, and all cervical glands were palpable. The labia majora and the perineum were now markedly swollen. The subcutaneous and superficial portions of the external sphincters were destroyed in their entire circumference. There was still continence, owing to the intact anorectal shelf and deep portion of the external sphincter muscle. The rapidity of the terminal stage is shown in the last two blood samples.

On March 16, 1948, the patient began to complain of severe pain in the left shoulder. Later in the day she became comatose. She died on the following day.

SUMMARY

A case of monocytic leukemia with necrotizing oral and anorectal involvement is reported. The author states that he considers the case worthy of recording because of the anorectal involvement, which is apparently rather rare in cases of leukemia.

RÉSUMÉ

L'auteur rapporte un cas de leucémie monocytaire avec nécrose de la bouche et de la région anorectale.

RIASSUNTO

Viene riferito un caso di leucemia monocitica associato a lesioni necrotiche nella cavità orale e di quelle anorettale. L'Autore considera tale osservazione meritevole di essere descritta a causa dell'interessamento ano-rettale, piuttosto raro in casi di leucemia.

RESUMEN

Se comunica un caso de leucemia monocítica con complicación necrotizante oral y anorectal. El autor establece que considera el caso importante de comunicar por la complicación anorectal, que es aparentemente rara en los casos de leucemia.

ZUSAMMENFASSUNG

Es wird über einen Fall von monozytärer Leukämie mit nekrotisierenden Erscheinungen in der Mundhöhle und am Mastdarm und After berichtet. Der Fall verdient, nach der Ansicht des Verfassers, veröffentlicht zu werden, weil die Erkrankung des Mastdarms und des Afters bie der Leukämie offenbar ein seltenes Vorkommnis darstellt.

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Retromesocolic Hernia

Development and Treatment

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HERNIATION of the bowel into intra-abdominal sacs formed of mesocolon that would normally be fused to the posterior parietal peritoneum has been variously termed 'retroperitoneal hernia,' 'paraduodenal hernia,' 'retromesocolic hernia,' 'intra-abdominal hernia,' and other more specific terms to denote their location. Very few have been diagnosed preoperatively. Most of them have been discovered incidentally at operation, during dissection, or at autopsy. Many have been identified at operation for unrelated causes and left, undisturbed, only to necessitate emergency intervention later for volvulus or some other complication.

Hansmann and Morton[1] reported the frequencies of intra-abdominal hernia (Fig. 1). Lahey[2] has reported that the operative mortality rate for right paraduodenal hernia alone is 50 per cent. Few statistics are available on hernias in other retromesocolic locations.

Throughout the last eighty or more years, in which this often lethal anomaly of arrested development has been recognized, many conflicting theories, specious and rational, have been recorded with regard to their origin. This state has developed because no one writer has ever been privileged to observe more than a few cases.

It is the purpose of this paper to outline a theory of the evolution of these hernias in order that the terminology may be clarified, that the anatomic character may be more readily recognized and repair thereby facilitated, and that a new case of retromesocolic hernia may be presented in which the lesion had developed to a stage never before reported.

REPORT OF A CASE

L. S., a 26-year-old chronically emaciated white man, entered the hospital twelve hours after the gradual onset of intermittent pain in the right lower quadrant of the abdomen. He had had two normal bowel movements the previous day, but no nausea or vomiting. His past history contributed nothing save that he had passed his Army physical examination a few weeks before. He was pale and poorly nourished, but was cooperative. There was marked rigidity in the right lower abdominal quadrant; hypoactive bowel sounds were noted, as was an area of tenderness over McBurney's point. The leukocyte count per cubic millimeter of blood was 16,500.

With the region under spinal anesthesia, a muscle-splitting McBurney's incision was made through the abdominal wall and peritoneum, which permitted the intestines to fall away from the lifted peritoneum enclosed in another peritoneum-like membrane, which was traversed by thin parallel blood vessels (Fig. 2).

Anomalous Sac.—The incision was enlarged to facilitate examination of the abdomen. This sac was seen to contain all the small bowel from the second part of the duodenum, the cecum and the ascending portion of the colon. There was no anatomic third part of the duodenum and no ligament of Treitz, for the duodenum entered the sac straight caudad *from its second part. The neck of the sac* was formed of the upper ascending portion of the mesocolon; the remainder of the sac, of the lower portion of the ascending mesocolon and the mesentery of the terminal portion of the ileum. It presented a free edge posteriorly, which surrounded the entering small bowel

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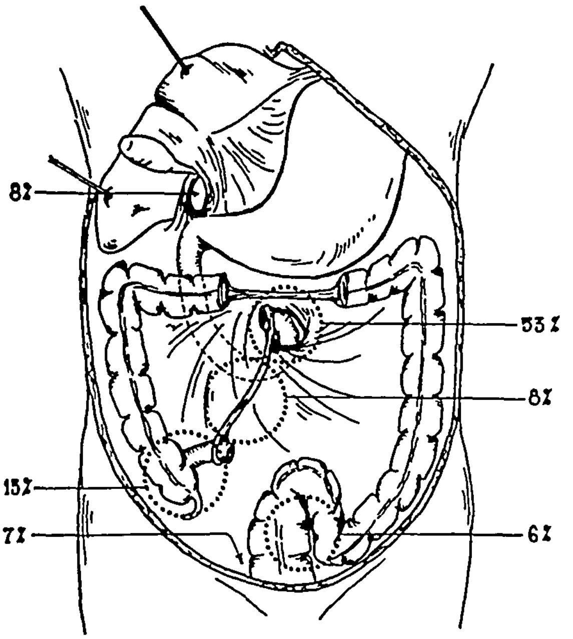

Fig. 1—Regional distribution of intra-abdominal hernias (Hansmann and Morton[1]).

*Paraduodenal	53%
*Pericecal and terminal ileum	13
*Perimesenteric	8
Foramen of Winslow	8
Pelvic	7
*Retrosigmoid	6
Miscellaneous	5
*True retromesocolic Hernias†	

and the emerging colon. Except for narrowness of the descending portion of the colon and the sigmoid, no other anomaly or pathologic condition could be discovered than the large, suppurative appendix.

Incision was made into the sac parallel to the vessels. Circulation to the enclosed bowel was excellent, and there was no constriction at the neck of the sac. It was decided that nothing should be done to disturb the symptomless anomaly; therefore, the appendix was simply removed from the high-lying cecum, and the sac and abdominal wall were closed in layers.

The patient's convalescence was uneventful for six days, after which pain suddenly developed in the right lower abdominal quadrant, with distention. Roentgen examination revealed no gaseous distention or free gas, but a film taken a few hours later, after some subsidence of symptoms, (Figs. 3*A* and *B*) revealed free gas under the anomalous membrane. The temperature rose rapidly, and the patient's general appearance became worse while he was prepared for operation.

Through a long right rectus incision it was discovered that the sac and its contents had rotated nearly 45 degrees to the left, occluding the circulation to the enclosed terminal portion of the ileum and the cecum, both of which presented the purplish discoloration of early gangrene. The mesentery to the terminal portion of the ileum and the lower portion of the ascending colon, which made up the anterior wall of the sac, must have been the first to suffer occlusion of its vessels, for both segments had become nonviable and had ruptured some 3 inches (7.5 cm.) above the intact appendiceal stump.

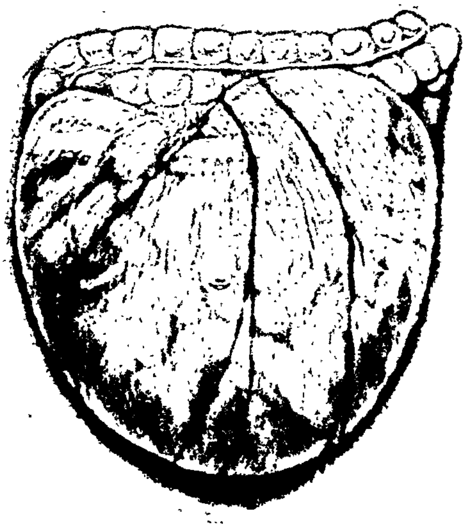

Fig. 2.—Drawing of hernia in author's case. Note entrance of duodenum (the horizontal uppermost centrally placed small bowel), exit of ascending colon, dimly seen continuation of neck of encircling sac posteriorly, high-lying cecum as related to the superimposed umbilicus, and the narrow descending colon, all of which were difficult to picture in this two-dimensional drawing.

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†Herniation through the foramen of Winslow, however, may not necessarily be of congenital origin for its development depends upon freely moving small bowel with a long mesentery and/or unfixed ascending colon. Both large and small bowel have been found in the omental bursa. The hernias listed in the diagram but not starred cannot be considered under the heading of this paper.

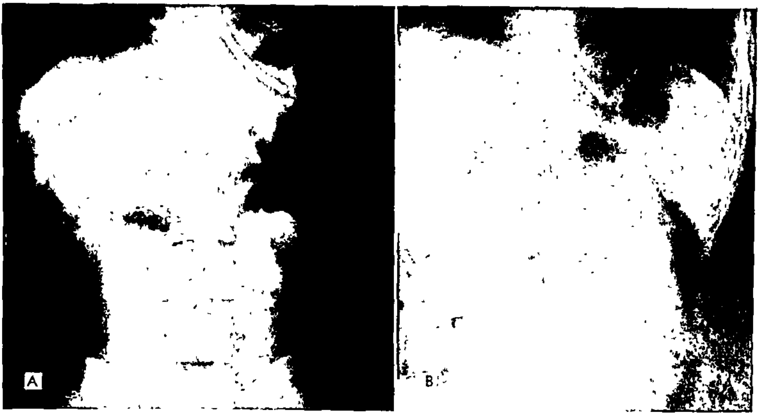

Fig. 3.—*A*, roentgenogram of erect patient, revealing free air trapped beneath the anomalous sac. *B*, roentgenogram of patient lying on right side, revealing free air under the anomalous sac.

A resection was done of the gangrenous bowel, followed by primary anastomosis and removal of the redundant sac. Despite supportive therapy, including administration of blood and antibiotics, the patient's temperature continued to rise and his color and general condition to become worse, and he died on the following morning.

Rotation of the Bowel and Fixation of the Mesocolon.—In order to arrive at a clear understanding of the anatomic features of such a hernia it is necessary to review the normal development of the bowel and its mesenteries. Figure 4 illustrates briefly the stages in fetal umbilical cord herniation of the bowel, return to the abdominal cavity, rotation of the large bowel, and fixation of the mesentery root and mesocolon.

Theories of the Evolution of Retromesocolic Hernia.—Treitz[3] (cited by Longacre[4]) stated that the fossae are the seat of origination for retromesocolic (previously called 'retroperitoneal') hernia—"The fossae are deepened and widened by the pressure and peristaltic movement of the intestines to produce a true hernia sac." This would seem a plausible first guess at the method by which they are formed. However, to consider that retromesocolic hernias are formed by intrusion of bowel into the fossae militates against current knowledge of intra-abdominal hydrodynamics, for there can be no such gradients of pressure within different portions of a closed container like the abdominal cavity. To illustrate their evolution as in Figure 5 draws rather freely upon artist's license, for there appears to be no force present in the fetal or the adult abdomen that could swing the unfused mesocolon about and into its place against the thrust of much entrapped bowel, thus outpouching the mesocolon and forming a sac.

Drye[5] reported a difference of pressure of some 10 to 12 cm. of water between the upper and lower portion of the abdomen of the erect human being, which is simply due to a higher column of abdominal contents above the lower portion of the abdomen. But, although he stated that abdominal pressure may exceed that of air pressure outside the body by some 150 cm. of water upon coughing, there can be no such gradients of [illegible] in different

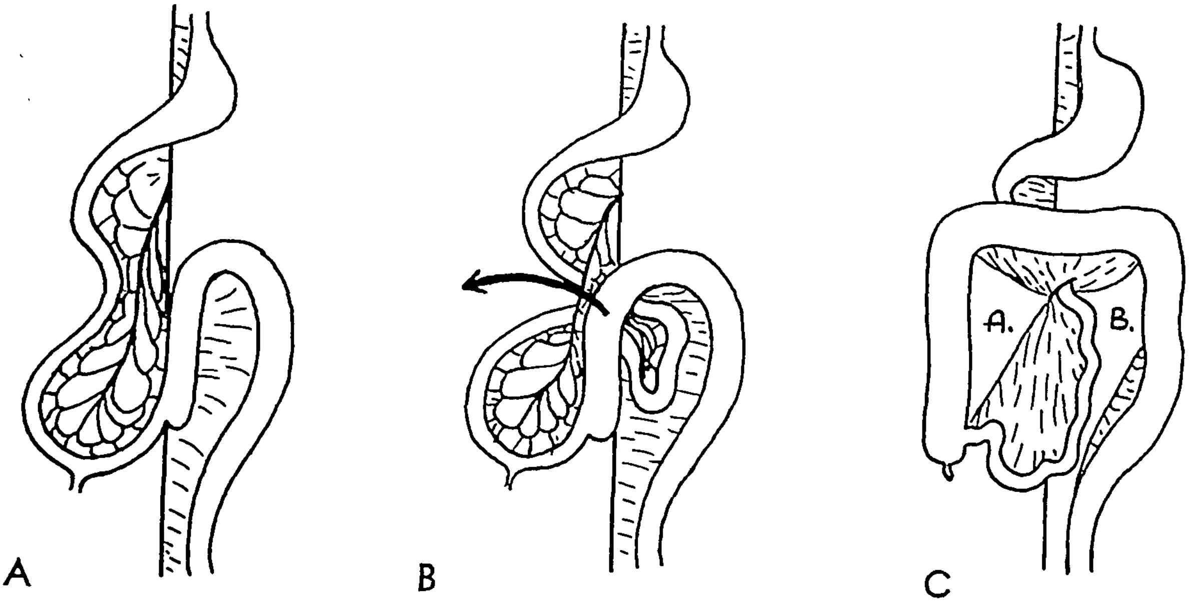

Fig. 4.—*A*, diagram of normal herniation of the bowel into the umbilical cord of the developing fetus. *B*, return of the bowel into the abdominal cavity, and early rotation. *C*, normal juvenile and adult intestinal anatomic picture. *A* and *B* indicate extent of fusion of ascending and descending portions of mesocolon.

portions of a closed container such as the abdominal cavity.

Formation of "Malrotated" Bowel.—It seems much more logical to assume that, if the amount of small bowel left behind the mesocolon were great, no fusion would ever take place. If no fusion were to take place due to this "critical mass," there would then be the free, left-sided ascending and transverse portions of the colon associated with the partial or arrested rotation (malrotation) phenomenon. "Partial" rotation then would be the more accurate term, and "malrotation" a misnomer.

Moynihan,[6] cited in an article by Andrews,[7] stated: "In its gradual augmentation of size, the hernia will be affected by: (1) The laxity of the retroperitoneal tissues, and (2) the extensibility of the peritoneum (referring to mesocolon*)."

Andrews,[7] however, did not accept these observations, but based his entire theory of the formation of these hernias on the sole premise of the trapping of a greater or lesser amount of small bowel behind the developing mesocolon, somewhat as in Figure 5. Many writers accepted this theory after his paper was published in 1923.

But Moynihan[6] also referred to this phenomenon. "In others (in the fetus*), it will be observed that even when the cecum has reached, or about reached, the right iliac fossa, there are coils of small intestine between the large gut and the posterior abdominal parietes." He indicated thus that this condition may occur often during the return of the bowel to the abdomen and the rotation of the large bowel over the small bowel, but that ". . . the secondary adhesion of the colon is delayed until the small intestinal coils have withdrawn (free into the abdominal cavity*) from their position . . ." He thus pointed out that often the formation of these hernias is begun by a lagging rotating small bowel but is aborted by withdrawal of the trapped bowel from behind the mesocolon, which movement would then give rise to normal anatomic arrangement.**

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*Author's inserts.

*Author's inserts.

**Moynihan, incidentally, was the first to recognize the more common retrocecal appendix as a similarly formed hernia of lesser magnitude, for he described it as being formed when it fixed itself to the posterior parietal peritoneum before the cecum descended to its normal position.

One can rarely visualize directly the development of normal or abnormal anatomic structures. In developing theories, especially concerning the abdomen, one must depend rather upon a kaleidoscopic series of still pictures, or "stages," as they are termed in different reports, and attempts to arrange them in a logical sequence, aided only by the available knowledge of developmental anatomy and physiology. In the accompanying drawings only the perimesenteric type of retromesocolic hernia will be represented. In the bibliographic sources, however, will be found descriptions, drawings and photographs of hernias of various sizes in newborn infants, children and adults, not only in this location but in the other three general locations: paraduodenal, paracecal and retrosigmoid.

Factors in the Development of the Retromesocolic Hernia.—1. A variable but small amount of small bowel is entrapped behind the developing mesocolon (Fig. 6*A*). As the small bowel (previously lying cephalad to the colon) rotates and normally comes out from behind the mesocolon to hang free in the abdominal cavity, a small portion remains behind. The mesocolon then falls over this small knuckle of bowel and begins its attachment about it to the posterior parietal peritoneum.

2. The sac so formed is enlarged by (a) growth of the trapped bowel or (b) separation of the surrounding lightly fused mesocolon through the pressure and weight of the sac contents.

Stability of the hernial contents at this stage then occurs, thus limiting the size of the hernia, or:

3. More bowel enters the enlarging sac as the contained bowel temporarily diminishes its own bulk through early peristaltic movement. The sac, though it remains the same size, thus accommodates more bowel. Later, growth of the contained bowel and increase in the bowel contents enlarge the sac by stretching it and/or releasing its physiologic adhesions to the posterior parietal peritoneum.

It is interesting to note that Andrews[7] stated, "Herniated viscera are never anything but small bowel." The case, here presented, therefore, represents an ultimate stage in the development of this type of hernia.

Terminology.—Some difference of opinion has existed through the years as to the naming of these hernias. "Intra-abdominal" may include any Richter's hernia and thus may not be specific. "Retroperitoneal" is definitely a misnomer except in the lone

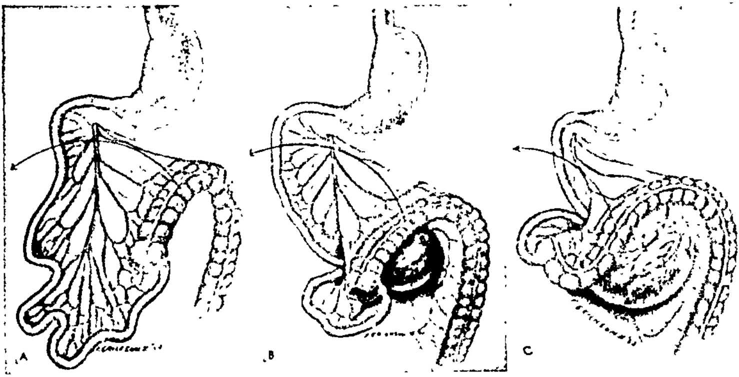

Fig. 5.—Drawings to illustrate an early theory of formation of "retroperitoneal" hernias.

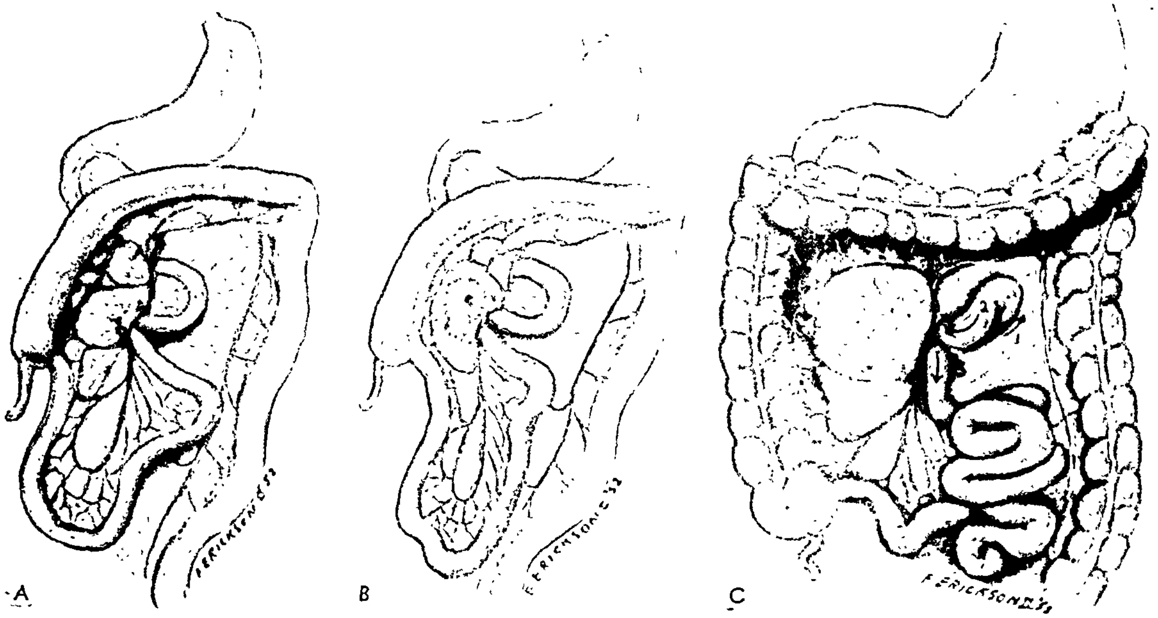

Fig. 6.—*A*, late stage of rotation in which the ascending mesocolon, in fusing to the posterior parietal peritoneum, has overlain a small knuckle of bowel. The cecum is still in the right upper quadrant. This small "herniation" represents the perimesenteric type of retromesocolic hernia but should be readily visualized as occurring in any of the other three major sites: periduodenal, pericecal or retrosigmoid. *B*, the cecum and ascending colon are still in process of rotation, while the root of the mesentery is seen to form a definite neck to the enlarging sac. *C*, the herniation is larger and the cecum has completely rotated. The loops of small bowel are numbered in sequence from the first part of the jejunum to facilitate recognition of their course.

case reported by Longacre.[4] He pictured his left-sided hernia as retromesocolic at first, but, after fixation of the colon to the posterior parietal peritoneum, the growth of the contents pulled out the peritoneum to form a posterolateral wall of the sac.

Since all these hernias develop in essentially the same manner, and their sacs are made up of mesocolon, which particular area has never fused or only partially fused with the peritoneum, I consider the generic term "retromesocolic hernia" most appropriate. In order that the location may be readily identified, it would be well to continue to use the specific names (paraduodenal, retrocecal, retrosigmoid, etc.) augmented, if necessary, by the fossa references.

Treatment.—These hernias are subject to the complications of external hernias, such as strangulation and even volvulus, as in the present case. Whenever they are recognized, I suggest their routine repair, based on an attempt to construct the approximately normal anatomic picture or to prevent complications in the apparently innocent hernia. It is unnecessary and usually impossible to produce a normal adult anatomic abdominal picture from a stretched mesocolon sac and an abnormal mesentery left short through agenesis. All that is necessary in any case of retromesocolic hernia is to remove the hernia from its sac and so fix the membranes as to eliminate permanently the danger of volvulus, strangulation of the bowel or the vascular supply. Repair will vary with the conditions present at operation, from simple withdrawal of the contents of the small sac and closure of the orifice to extensive dissection, opening of the sac, eversion of the contents, removal of redundant mesocolon, closure of the artifactual rent, and, if necessary, suturing of the mesocolon and/or the root of the mesentery to the posterior parietal peritoneum to prevent volvulus if the hernia is large. Repair of the larger hernias can be accomplished only through an incision sufficiently large to visualize and even eviscerate the entire anomaly.

SUMMARY

1. A review of theories as to the development of retromesocolic hernia is presented.

2. Theories are suggested for (a) the evolution of retromesocolic hernia and (b) the evolution of partially rotated bowel including the high-lying cecum and the free, unattached, or "left-sided" ascending colon.

3. Two generic terms are suggested: (a) retromesocolic hernia and (b) partially rotated bowel (instead of "malrotation").

4. A new case is repor
ly the *entire small bov*
portion of the colon we

5. Suggested treatmer

ZUSAMMENFA

1. Es wird ein Uel
Theorien der Entwicklu
kolischen Hernie gegeb

2. Es werden Theorie
dekommen (a) der r
Hernie und (b) der unv
ausbliebenden embryona
unterbreitet.

3. Zwei Hauptben
vorgeschlagen: (a)

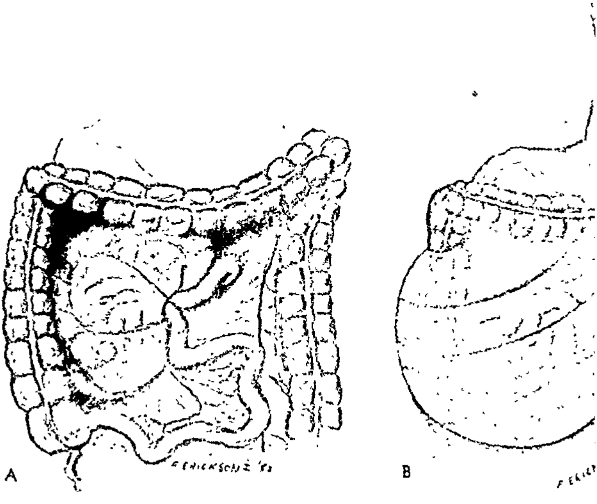

Fig. 6 (*continued*).—*A*, photographs and drawings are included in the literatur
adult hernias, the growth of which have apparently been arrested at each of the st
seems but an advanced stage of the conditions shown in the first part of Fig. 6, (I
large perimesenteric (retromesocolic) hernia. If the neck of the sac were slightly
duodenum, or should the mesenteric root bridge between the afferent loop and the
separate from the peritoneum, the hernia would be called a right paraduodenal
struction of final stage of evolution of present case. It will be noted that the ascen
colon has been drawn twisted at the mouth of the now round sac. In our exp
artefactual retromesocolic hernias of the entire small bowel (for which I am inde

Hernie und (b) partiell gedrehter Darm.

4. Es wird ein neuer Fall berichtet, in dem fast der ganze Dünndarm und der aufsteigende Dickdarm einbegriffen waren.

5. Es wird ein Abriss der vorgeschlagenen Behandlung vorgelegt.

RIASSUNTO

1. Vengono presentate diverse teorie a proposito dello sviluppo dell'ernia retromesocolica.

2. Vengone suggerite teorie per (a) l'evoluzione dell'ernia retromesocolica e (b) per l'evoluzione della malrotazione e non rotazione intestinale.

3. Vengono proposti due termini: (a) ernia retromesocolica e (b) rotazione parziale dell'intestino.

4. Viene riportato un caso di ernia in cui era incluso quasi tutto il tenue e la porzione ascendente del colon.

5. Viene trattata la terapia.

RESUMEN

1. Se presenta una revisión de las teorías del desarrollo de la hernia retromesocólica.

2. Se sugieren teorías para: (a) la evolución de la hernia retromesocólica y (b) la evolución de la malrotación del intestino.

3. En términos generales se sugiere: (a) hernia retromesocólica y (b) rotación parcial intestinal.

4. Se comunica un caso en el cual casi todo el intestino delgado y el colon ascendente se encontraban atrapados.

5. Se delínea el tratamiento sugerido.

RÉSUMÉ

L'auteur passe en revue les théories de la hernie rétromésocolique, avec emphase sur l'évolution de la hernie rétromésocolique et de l'intestin "qui n'a pas fait de rotation." L'auteur suggère ces deux appellations. L'auteur rapporte un cas particulier avec son traitement.

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Conservative Therapy of Carotid Body Tumors

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THE purpose of this paper is to review the subject of roentgen therapy of carotid body tumors, a form of therapy which, in our opinion, has been given inadequate trial. No mention of the embryologic, anatomic, pathologic or symptomatologic background of carotid body tumors will be made, since most articles that have been written on this subject have covered those aspects adequately. Excellent papers have been written by Lahey and Warren, Bevan and others.

Up to the time of writing, about 300 cases of tumor of the carotid body have been reported. Many of the papers have mentioned roentgen therapy, but in most instances only as a method offering little hope of success. Some, however, have discussed it with enthusiasm. For example, in 1929 Bevan stated: "The result of these treatments must be accepted as having produced practically a cure, and it seems to point to the conclusion that treatment with the roentgen ray, with its very slight danger, is much to be preferred to the operative treatment of these tumors which carries with it the enormous mortality of more than 30%."[1] On the other hand, in 1937 Phelps and Snyder concluded, "Since carotid body tumors are not amenable to radiation therapy, hope for successful treatment lies solely in their surgical removal."[2] MacComb[3] in 1948 reported several cases in which roentgen therapy in small amounts was given because of mistaken diagnosis. The results were discouraging. In 1950 Lattes[4] called attention to tumors arising from other sites, such as the ganglion nodosum and the middle ear, but resembling tumors of the carotid body. In his Case 4 the lesion, judged inoperable, arose in the vagus. The patient was given 13 roentgen treatments and later died of poliomyelitis. Autopsy disclosed a dense scar with an encapsulated vascular tumor in the carotid bifurcation, and another higher up. The tumor obviously responded favorably to roentgen therapy. Few of the papers give details of dosage or duration of treatment, so that it is difficult to draw conclusions. Enough cases, however, have been reported in which benefit was obtained from roentgen therapy to give one the distinct impression that perhaps surgeons are overlooking a means of attacking these tumors without the prohibitive mortality rate associated with surgical excision.

As Lahey and Warren have stated, "The ideal treatment of carotid body tumors is complete surgical excision. The hazards of total extirpation, which derive from the necessity of ligating the carotid vessels in approximately 50 per cent of cases in which total excision is practiced, is such as to justify not employing this procedure."[5] In about 30 per cent of cases in which the common carotid artery must be ligated, hemiplegia develops and the patient dies. This is true despite favorable compression tests as reported by Lahey and Warren. To attempt resection in the face of such an alarming mortality rate seems needlessly radical unless malignant change cannot be ruled out. Even then, if a more conservative means offering a reasonable chance of success is at hand, there is much to be said in favor of postponing surgical intervention, until lack of benefit by other means is proven. Particularly is this true when one considers that there is widespread difference of opinion as to the relative incidence of malignant tumors of the ca[illegible] body. Christopher[6] stated that

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of carotid body tumors are malignant. Harrington, Clagget and Dockerty said that all tumors of the carotid body should be considered low grade malignant tumors. Lahey and Warren,[7] on the other hand, have expressed the opinion that the incidence of malignant manifestation is actually considerably lower than was previously thought. No doubt this lack of agreement has been responsible for the persistence of surgical therapy despite the associated high mortality rate. At best, surgical extirpation is difficult because of the adjacent great vessels and nerves and the deep extensions of the tumor to the pharynx and skull.

The diagnosis is usually made during surgical exploration under the misconception that the tumor is a cyst of the branchial cleft. The solid, encapsulated mass is discovered to be intimately connected with the carotid bifurcation, thus making its identity known. What plan, then, should be followed when the surgeon discovers a tumor of the carotid body during cervical exploration? If it is one that can be removed without difficulty and without endangering the carotid vessels, then this should be done. At times, however, merely peeling the tumor off the carotid adventitia results in thrombosis. If removal is obviously hazardous, a biopsy specimen should be taken and the operation terminated. If the tumor is causing symptoms of pressure or is large enough to cause an obvious bulge, be it benign or malignant, it is our conviction that adequate roentgen therapy has a good chance of solving the problem, as it did in the case to be presented here. If there is no response, then operation may be reconsidered, but it would seem that only severe symptoms or obvious malignant disease would justify a procedure associated with such an appalling mortality rate. Certainly little can be lost and much gained by a trial of roentgen therapy. The tumor is usually vascular, so one would anticipate a favorable response to irradiation.

REPORT OF CASE

Mrs. M. C., white woman aged 46, was first seen as an office patient on April 20, 1951, complaining of a "swelling" in the left side of the neck which had been present for ten years. It was first noticed as a small painless mass, but in the past year the mass had increased in size. Periodically during the past year the patient had noticed also the occurrence of sharp lancinating pain in the left pre-auricular area, radiating to the left tempero-parietal region.

The patient's health had been excellent except for the "low blood pressure." A review of systems gave negative results. The blood pressure in millimeters of mercury was 130 systolic and 70 diastolic. The temperature was 99 F. and the pulse rate 88. The patient was well developed and well nourished. There was an obvious swelling just anterior to the upper third of the left sternocleidomastoid muscle. This mass was firm, slightly tender and fixed. The overlying skin was normal and freely movable. There was no evidence of lymphadenopathy, abnormal pulsation or fluctuation. The remainder of the physical examination revealed an otherwise apparently normal woman.

Complete laboratory tests of the blood yielded the following values: hemoglobin, 11.9 gm. per hundred cubic centimeters (82 per cent); erythrocyte count per cubic millimeter, 4,100,000, and leukocyte count per cubic millimeter, 4,200, with a differential count of 62 per cent polymorphonuclear leukocytes, 2 per cent stab cells, 34 per cent lymphocytes and 2 per cent eosinophiles. Urinalysis showed the urine to be yellow and slightly cloudy, with a *p*H of 5.5 and a specific gravity of 1.014. Microscopically it was seen to contain occasional leukocytes and bacteria and a few epithelial cells.

The clinical diagnosis was branchial cleft cyst, with the possibility of a carotid body tumor. The patient was hospitalized on May 2, and on May 3, with nitrous oxide-oxygen-ether anesthesia, cervical exploration was performed through a longitudinal incision parallel to the anterior border of the left sternocleidomastoid muscle overlying the tumor mass. The muscle belly was retracted laterally to expose the ovoid tumor mass, which was somewhat larger than a plum. It was intimately associated with the carotid vessels, and its capsule contained numerous branching dilated veins; in appearance, it was much like a lobe of the thyroid gland. The internal jugular vein was stretched over the surface of the tumor, so it was freed and divided. Attempts to mobilize the tumor provoked profuse bleeding from the overlying veins. This was difficult to control, so the operation was terminated. Postoperatively the patient complained bitterly of pain over the tumor radiating into the left ear. The wound healed well, and the patient was discharged on May 9.

When she was seen in the office later, on May 23, her complaints included hoarseness as well as pain. The swelling, of course, was still apparent. Indirect laryngoscopic examination demonstrated some distortion of the left side of the pharynx by an extrinsic mass. The larynx was normal. It was decided that reexploration should be done, at least for biopsy purposes, so that the efficacy of roentgen therapy could be decided upon. The patient was rehospitalized on June 6, and on June 7, with nitrous oxide-oxygen-ether anesthesia, with a nasotracheal tube in place, cervical exploration was again attempted through the scar of the previous operation. Several biopsy specimens were taken from the tumor mass, and bleeding was controlled with difficulty. It was obvious that the carotid vessels were intimately involved and that their ligation would be required if the tumor were to be resected. Frozen sections were inconclusive. The wound was closed and subsequently healed *per primam*.

Pathologic Picture (Dr. A. E. Rhoden).—"Gross: The fragments of tissue are from 4 to 16 mm. in diameter. Some of the tissue is gray and friable. Other fragments are more dense and hemorrhagic.

"Frozen: In areas small cells are arranged about blood vessels. A carotid body tumor is strongly suggested.

"Microscopic: The tissue is composed of small epithelium-like cells arranged in syncytial masses which surround numerous epithelium-lined vascular spaces. Their nuclei are larger and variable in size. Some cells are polyhedral and show alveolar arrangement. Their cytoplasm is in places rather dark staining and slightly granular, while in others it tends to be vacuolated and then gives rise to visible cell boundaries. Some RBC's are seen in these vascular spaces.

"Diagnosis: Carotid body tumor."

A trial dose of roentgen therapy was decided upon, and from June 20 to June 27 the patient was given 1,000 r to a 10 cm. round port. The following excerpts from office notes are presented:

June 27: Pain and stiffness decreased. Marked regression in size of tumor.

July 3: Patient states mass is now smaller than it has been for seven years.

From July 3 to July 18 the patient was given an additional 2,400 r, 300 r per day. The total dose, then, was 3,400 r. Again we quote the office records:

July 18: Pain-free for a week.

August 1: Mass much smaller. Pain-free for three weeks.

October 8: Some stiffness in neck; no pain.

January 9: Mass barely visible. No pain.

COMMENT

We are well aware that one or even many such cases can prove nothing statistically. Nor do we hold any brief for the indiscriminate use of roentgen therapy on all tumors of the carotid body. In our opinion, however, this case and others like it reported in the literature prove the worth of this conservative mode of therapy, particularly when one considers the prohibitive mortality rate of surgical extirpation. Undoubtedly there will be failures with roentgen therapy, but there are few instances in surgery of any one therapeutic approach that is invariably successful.

Since the benign tumors grow slowly and cause only pressure symptoms, and since the incidence of malignant tumors of the carotid body is still in doubt, we suggest that a conservative approach that offers a chance of cure in a good number of cases is well worth considering seriously.

SUMMARY

A case of tumor of the carotid body is reported, in which roentgen therapy proved to be effective. The authors hold no brief for the indiscriminate use of roentgen therapy for all such tumors, but are convinced that conservative measures of this kind are [illegible] sider[illegible] in view of the [illegible] ated with [illegible]

RÉSUMÉ

Les auteurs rapportent un cas de tumeur de la carotide traitée avec succès par la radiothérapie. Les auteurs ne préconisent pas la radiothérapie d'emblée pour toutes les tumeurs, cependant, à cause du taux de mortalité élevé, il faut tenter d'abord les procédés plus conservateurs.

RIASSUNTO

Viene riferito un caso di tumore del glomo carotideo in cui la roentgenterapia si rivelò efficace. Gli Autori non pretendono che tale cura debba essere indiscriminatamente usata in tutti questi tumori, ma sono convinti che mezzi conservativi di tal genere meritino la più alta considerazione data l'alta mortalità dell'estirpazione chirurgica.

RESUMEN

Se comunica un caso de tumor del cuerpo carotídeo, en el cual el tratamiento con rayos roentgen probó ser efectivo. Los autores sostienen que no debe discriminarse el uso de la roentgen terapia para todos esos tumores, pero estan convencidos que las medidas conservativas de esta naturaleza valen la pena de considerarse en vista de la alta mortalidad asociada con la extirpación quirúrgica.

ZUSAMMENFASSUNG

Es wird über einen Fall einer Geschwulst des Karotiskörpers berichtet, in dem die Röntgenbehandlung sich als wirksam erwies. Die Verfasser haben nichts übrig für eine wahllose Anwendung der Röntgenstrahlen zur Behandlung solcher Geschwülste, sind aber überzeugt, dass derartige konservative Massnahmen im Hinblick auf die hohe mit der chirurgischen Resektion verbundene Sterblichkeit Beachtung verdienen.

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> It (the university) is a great laboratory in which we collect for rectification the experiments which nature makes upon us. The study of disease is just as much a part of university work as is the study of mathematics, and a close affiliation of the two institutions is the best *guarantee of that combination of science with practice* which it is the right of people at the present day to demand.
>
> —*Osler.*

Three Minutes in Cardiac Arrest

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DEATH from cardiac arrest during a surgical procedure is due to the lack of oxygen in the vital centers of the brain. These vital and highly sensitive cells can withstand the lack of oxygen, caused by the failure of the circulation, for not more than three and one-half minutes.[1] All efforts directed toward the successful resuscitation of these patients must have only one goal—minimizing the degree and duration of cerebral anoxemia. The importance of oxygen to the heart muscle is second only to its need by the brain cells.

Cardiac arrest is the sudden and unexpected stoppage of heartbeats occurring during the induction of any type of anesthesia for any type of surgical procedure, or in the recovery room shortly after such a procedure. No surgical emergency outranks cardiac arrest. Only the severance of a large artery or vein is comparable.

This emergency is not a new disease but a situation to which surgeons have slowly been awakened through the efforts of men like Bailey, Lahey and Ruzicka, Gunn, Nicholson, Primrose, Wiggers and many others.

Operative risks have been improved and the possibility of complications greatly lessened by careful preoperative study and meticulous preoperative attention to detail. Such care brings many patients to the operating room for whom surgical intervention would not have been considered previously; it enables the surgeon to arrive at a better evaluation of the case; it enables him to anticipate and sometimes to prevent many serious complications that would have occurred in the past. At the same time, however, it brings more patients in relatively poor condition to operation. Many such patients would have only death, possibly preceded by severe and prolonged pain, as an alternative. These are accepted as calculated risks.

Such relative poor risks do tend to increase the incidence of cardiac arrest. The attempts to save life by cardiac massage have highlighted them, whereas previously no attempts had been made to resuscitate them and many patients died an "anesthetic death" or died from "shock" or from "failure to recover from the anesthesia." Bailey[2] has had about 2 cases per year and Lahey[1c] 13 cases in seven years, in which 7 of the patients recovered; of these, 5 were normal mentally.

The literature indicates that the first death attributed to anesthesia occurred on Jan. 28, 1848, just a little more than a year after the introduction of ether and only about two months after chloroform was introduced in obstetrics.[3] This was undoubtedly due to cardiac arrest produced by the anesthetic through anoxia. Successive experiments and observations gradually led to the development of the current method of treating this emergency. For example, Schiff experimented with manual massage for cardiac resuscitation in 1874, and Niehas in 1889 first attempted cardiac massage in man;[1b] Ingelsbrid first succeeded in resuscitating the human heart in 1901; successful subdiaphragmatic massage was first reported by Starling and Lane[4] in 1902; Crile and Dolley[5] were the first to suggest, in 1906, that artificial respiration be perform
neously with the cardiac

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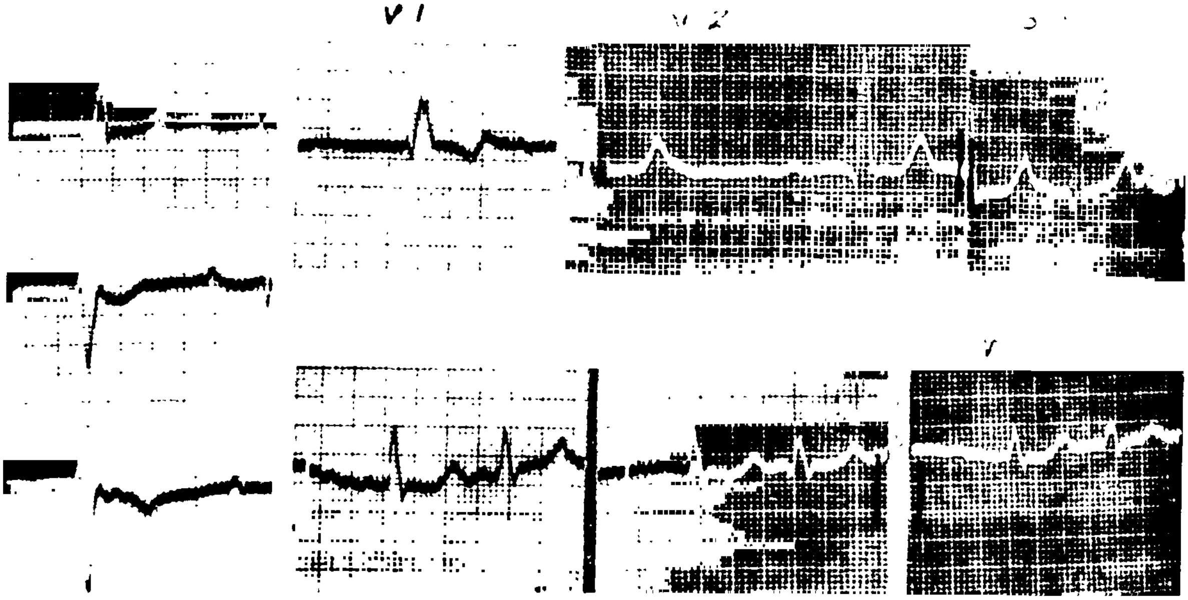

Fig. 1.—Preoperative electrocardiograph of J. Y., showing complete heart block with idiopathic ventricular rhythm and a left bundle branch block. The auricular rate was 75, and the QRS 0.12. The T3 wave was inverted.

Beck[6] in 1941 was the first to achieve successful defibrillation of the human heart.

In 1921 Gunn[1d] outlined a rational treatment of cardiac massage and drug administration based on animal experiments. Beck and Mautz[7] in 1937 outlined the method of treating ventricular fibrillation which is, in essence, accepted today. Nicholson[1f] classified heart failure into three general groups as (a) a terminal event in a mortal illness, such as generalized peritonitis, intestinal obstruction, extreme age or extreme emaciation; (b) a phenomenon due to reflex inhibition anoxemia of the brain, and (3) a result of the toxic action of an anesthetic agent. Cardiac massage is most likely to be effective with the last two.

Types of Cardiac Arrest.—Three types of cardiac arrest are described[8]: (1) absolute arrest; (2) ventricular fibrillation, and (3) complete heart block with ventricular asystole (Stokes-Adams type).

Absolute arrest is the type most frequently encountered. It may occur during any phase of anesthesia or operation. It is usually produced by prolonged, severe anoxia caused by failure to supply sufficient oxygen; by excessive loss of blood, or by excessive reflex stimulation.

Ventricular fibrillation is infrequent, usually occurring during the induction or the recovery phase of anesthesia. It may be produced by excess epinephrine, toxic doses of anesthetic agents, cardiac manipulation or electric shock.

The Stokes-Adams type of cardiac arrest is probably the least frequent. This occurs in patients with preexisting heart block. Anoxia, manipulation, or reflex stimulation may precipitate the ventricular asystole.

Probably, anesthetic depression anoxia is the most common cause of cardiac arrest during or following an operation. Surgical shock with vasomotor collapse during an operation frequently induces cardiac asystole. Occasionally, myocardial infarction occurs during operation, with little chance of resuscitation.

Etiologic factors.—1. It is known that chloroform, ethyl chloride and cyclopropane can sensitize the heart to the action of epinephrine.[9]

2. Hypoxia sensitizes the carotid sinus[10]

producing inhibition of cardiac activity.

3. Hypoxia sensitizes the heart and causes an increased content of epinephrine in the circulating blood.[11]

4. Intravenous barbiturates and cyclopropane have a parasympathetic effect on the heart referable to the parasympathetic nervous system.[12]

5. Stimulation of the vagus nerve may inhibit cardiac activity.[9b]

6. Too deep anesthesia causes sudden simultaneous cardiac and respiratory arrest[1c] through anoxia.

Preventive therapy requires proper pre-anesthetic and anesthetic management, such as:

1. Attention to the fluid and electrolyte balance.

2. Adequate pre-anesthetic medication — "allays apprehension and depresses vagal function."[13]

3. Due consideration of the selection of anesthetic agents.

4. Adequate blood hemoglobin and red cell count.

5. Adequate anesthesia for traction or handling of viscera or for painful maneuvers.

6. Minimal hypoxia.

Diagnosis.—Premonitory signs may be an increase in pulse rate or the occurrence of arrthymia, followed by a decrease in pulse volume. The presumptive diagnosis of cardiac arrest is made on the basis of (a) absence of pulse, (b) "zero" blood pressure, (c) "white asphyxia" and (d) dilated pupils. These signs should be and are usually detected by the anesthetist. If the surgeon has exposed a large artery or is working in the upper part of the abdomen the artery or heart can be palpated for pulsations.

If these signs are present, cardiac arrest has occurred. Provided that the heart had not been severely damaged by prolonged injury or infection, immediate steps should be taken to resuscitate it. Useless, ineffective, time-consuming and unscientific procedures must not be attempted while the surgeon masters sufficient courage to open the chest. Listening to the precordium with a stethoscope for heart beats that cannot be recorded by a sphygmomanometer is but one of the futile gestures that spell defeat for the surgeon's efforts and inevitable death for the patient.

"The active treatment of a patient with an arrested heart is unequivocal and uncompromising, and must be instituted immediately."[14] "Resuscitation should be directed toward (1) immediate restoration of oxygen supply to the tissues, particularly to the brain and heart, and (2) restoration of spontaneous cardiac and respiratory activity."

Thousands upon thousands of attempts have been made under all combinations of circumstances to reactivate a stilled heart by the injection into it of most of the alleged cardiac stimulants through the precordium.[14] Almost all of these have failed.[15] Merely pricking the heart with a needle may produce an asinusoidal stimulus, and one heart is said to have been reactivated in this manner.

Many failures have been due to a misconception of the physiologic action of these drugs or to inadequate facilities for doing anything else. Only recently has it been known that epinephrine, which produced, at times, varied reactions, actually consists of two separate factors. These two factors produce totally different effects. The lesser factor is known as nor-epineph-

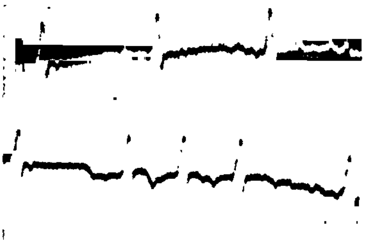

Fig. 2.—J. Y. Post-operative electrocardiogr
shows no changes in the t

rine and comprises about 15 per cent of the total. One of its actions is to increase and sustain blood pressure. The factor does not seem to cause fibrillation.

Most physicians have been taught in their early years of training to inject epinephrine (1:1,000) into the heart through the chest wall or intravenously for cardiac emergencies. Few clinicians have a clear idea of whether it should be diluted, and, if so, how much. Few realize the ability of the drug to produce ventricular fibrillation.[16] Bailey[17] has "never seen epinephrine alone revive a heart that has already stopped but it will increase the force of contractions in decided enfeeblement of the heart."

Wolff[18] has said that "it is doubtful whether an intracardiac (through the chest wall) injection of epinephrine ever does more than delay the application of better methods and, in some circumstances, may actually be harmful." Barber and Madden,[1a] in their exhaustive article on the subject, stated: "These drugs do nothing more than sensitize an excitable heart with the resultant production of fibrillation and death."

Time is the fourth dimension throughout the chemical world; in the conception, growth, development and death of man; in his daily life and relations with his fellowman; but nowhere and on no occasion is the factor of time of more importance than when a human heart stops after the induction of anesthesia or during a surgical operation.

Regardless of various reports[19] indicating recovery after "complete cardiac arrest" lasting up to nineteen minutes, the great preponderance of experimental work and clinical experience indicates that three to three and one-half minutes of complete arrest is the maximum period of complete anoxemia that the cerebral cells will tolerate and remain unimpaired.

Once the diagnosis has been made, a preconceived plan of action must be instituted immediately, with no lost motion, no fumbling and no waiting. Each member of the team must know his part and carry it out exactly as planned.

The sterile equipment on the anesthetic stand and *in the room*, is as follows:

1. Simple instruments and rib spreader or abdominal self-retaining retractor
2. Syringes, luer lock, 2 to 5 cc. or 10 cc.
3. Needles, G. 20, spinal type
4. Medications: Pontocaine, 1 to 2 per cent
   Metycaine, 10 per cent[18]
   Calcium chloride, 1 per cent
   Sodium chloride, 0.85 per cent
   Epinephrine hydrochloride, 1:1,000
5. Metal plates 5 by 5 cm. with post attachment for applying shock to defibrillate
6. Battery box or Variac transformer to deliver 0.8 to 1.5 amperes and 110 volts of a 60-cycle current

As soon as the decision is made to open the chest the team should proceed as follows:

Anesthetist:

1. Place patient in Trendelenberg position, 5 to 10 degrees
2. Insert endotracheal tube (or rigid airway)
3. Administer 100 per cent oxygen continuously, with use of rebreathing bag to force into lungs
4. Check pulse and blood pressure
5. Give blood, saline solution and intravenous medications

Scrub nurse:

1. Prepare syringes and needles
2. Hand instruments

Surgeon or first assistant:

1. Open chest rapidly (fourth left interspace)
2. Grasp heart, apex in palm, fingers toward base
3. Compress forcefully, 40 to fifty times per minute

Second nurse:

Call out time at thirty-second intervals.

Simultaneously the anesthetist, the surgeons and the nurses proceed to carry out their assigned steps in this great battle to resuscitate a heart.

A. The anesthetist stops administering any anesthetic agent, lowers the table to a 5 to 10 degree Trendelenberg position,

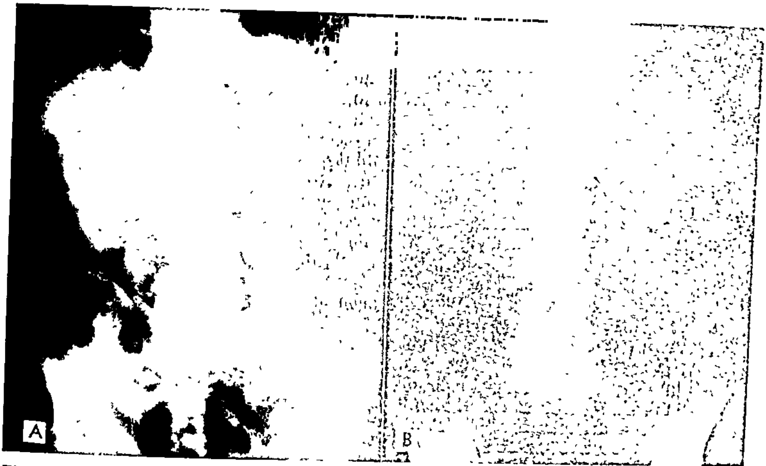

Fig. 3.—*A*, J. Y. Intravenous urogram showing definite filling defect in the lower pole of the left kidney. *B*, translumbar aortogram showing an abnormal renal arterial distribution, with "pooling" of the dye in the mass of tissue below the distorted renal pelvis. Such irregular concentrations of the dye occur only in tumors.

inserts an endotracheal tube and fills the lungs rhythmically with 100 per cent oxygen, using pressure on the rebreathing bag. Then an adequate flow of intravenous fluids is supplied, particularly blood or blood substitutes if indicated, by the intra-arterial route[20] if the loss has been sufficiently great.

B. The surgeon or his assistant, after not more than a few seconds spent with skin antisepsis and drapes (or omitting them entirely), performs a thoracotomy through the left fourth interspace extending from the lateral border of the sternum to the midaxillary line.[14] This should be accomplished in two or three strokes. The adjacent costal cartilages should be divided with a knife or even fractured with the spreader to save time. If the hand cannot be readily inserted, a rib spreader is placed in position. The heart is then palpated through the pericardium.

Diagnosis of cardiac arrest and its type is now definite. An entirely motionless heart indicates absolute arrest. Irregular crawling motions or the sensation of a "bag of worms" is diagnostic of ventricular fibrillation. Ventricular asystole, with more or less auricular activity, is associated with the Stokes-Adams type of arrest.

Various methods[14] and technics of cardiac massage have been tried and have, on occasion, been reported as successful: (1) massage through the intact diaphragm[14] from an abdominal incision made before or subsequent to the onset of cardiac arrest; (2) massage through an incision in the diaphragm made from the peritoneal cavity, permitting the insertion of the surgeon's thumb or his entire hand to grasp the heart; (3) blunt dissection of the fascial planes in the midline back of the sternum to permit insertion of the thumb. Some of these approaches may be made more rapidly if the abdominal cavity is already open, but all have the disadvantage of completely blocking (1) the top
plication of procaine hydrochlori
heart; (2) the intra-auricular inj
any medication, and (3) [illegible]

defibrillation in instances of ventricular fibrillation. Thus massage by these methods may be difficult, and, since such procedures are frequently inadequate, they delay, even if they do not completely obviate, the carrying out of additional measures to restore the normal heartbeat and supply oxygen to the brain. The time lost in doing a thoracotomy later may be the margin that means defeat.

Regardless of the type of arrest, cardiac massage is begun at once, since the circulation must be reestablished artificially within the three or three and a half minutes at most. Massage is performed by placing the thumb on one side of the heart and the fingers on the other, with the apex of the heart in the hollow of the palm, and compressing the heart about 40 to 50 times per minute in a rhythmic fashion.[21] The circulation must be maintained in this manner until effective cardiac action is restored or until the situation is considered hopeless. If the cardiac massage, performed extrapericardially, is inadequate (as determined by pulse, blood pressure and color) the pericardium should be opened, 5 cc. of 1 per cent procaine hydrochloride solution instilled into the right auricle or ventricle cavity and the heart compressed directly. The epicardium should be kept moist with 1 to 2 per cent procaine solution to lessen surface irritability. Johnson and Kirby[1b] have suggested diverting a greater part of the cardiac output to the brain by occluding the descending thoracic aorta. Carotid blood flow is greatly increased by this maneuver.

Cardiac massage will maintain sufficient circulation to prevent cerebral damage for considerable periods. Systolic blood pressures of 69 to 80 mm. of mercury or even higher are attained. Kay[22] noted that dogs with ventricular fibrillation could be maintained for over one hour by cardiac massage. After recovery these dogs showed no neurologic sequelae.

Once artificial circulation has been initiated by cardiac massage, specific measures may be required to reestablish spontaneous cardiac activity. These may be applied in a more leisurely manner than

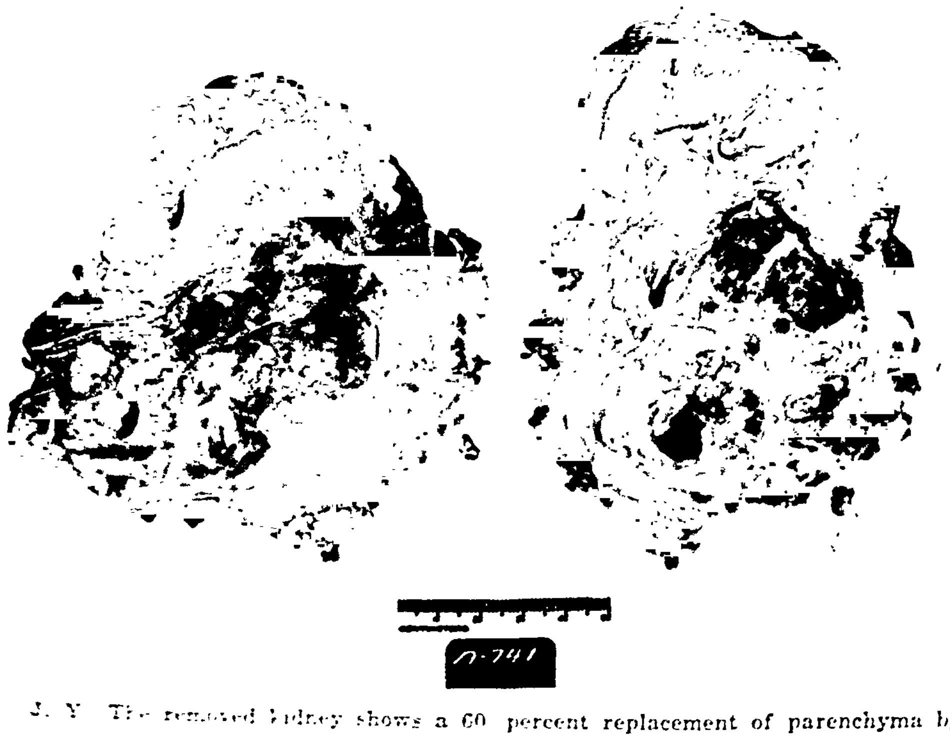

Fig. [illegible] J. Y. The removed kidney shows a 60 percent replacement of parenchyma by tumor.

the previous steps. They will be considered for each type of cardiac arrest.

Absolute Arrest: A heart in absolute arrest, without gross myocardial damage, will often resume spontaneous beating within a few minutes after nothing more than massage. Rest periods of a few seconds' duration should be provided at frequent intervals during the massage to encourage spontaneous cardiac systole. After weak systoles begin, reinforcement by cardiac compression just after each beat may be necessary for circulatory maintenance. If strong systoles do not soon develop, epinephrine, (1:1,000) 0.5 cc. diluted with 10 cc. of 1 per cent procaine hydrochloride, should be injected by the intravenous or the intra-auricular route.[19b] Atropine sulfate may help in refractory cases by diminishing vagal influence. Intravenous doses up to 1/150 (0.0004) gr. may be given. Lahey and Ruzicka[1e] emphasized the fact that the true value of drug therapy in cardiac arrest is to intensify the effect of cardiac massage. Since procaine is a myocardial depressant and decreases the tendency for spontaneous cardiac activity, large doses should be avoided.

Stokes-Adams Type: The measures advocated for absolute arrest generally apply to this type. Atropine is useful and should be given early.[14] "It renders the action of epinephrine solely sympathetic." Epinephrine may be given in small doses of 0.1-0.3 cc. diluted in 10 cc. of saline solution and injected into the chamber of the right auricle.

Ventricular Fibrillation: Reestablishment of effective cardiac action is impossible until every vestige of fibrillation has ceased. The first step to accomplish this is the administration of 10 cc. of 1 per cent procaine solution intra-auricularly. Occasionally fibrillary motion may then cease spontaneously.

Electrical defibrillation of the ventricles,[6] however, will usually be required. This is accomplished by passing through the heart a 60-cycle alternating current of 1 to 1.5 amperes and about 110 volts for one second or less and repeating several times if necessary.[23] If cardiac standstill is not yet present, serial defibrillation is used. This consists of applying the aforementioned current for one-third of a second, followed by a rest interval of the same duration, repeating for six to eight shocks. Cardiac standstill will almost always follow this.

Electric defibrillation requires two noncorrosive electrodes, 5 by 5 cm., a source of current (Variac transformer) and a controlling switch

After defibrillation has been accomplished, absolute arrest is present and cardiac massage is then continued.

After effective cardiac action has been restored, an observation period of about twenty minutes should elapse before the chest is closed. This is to assure that recurrence of the arrest will not follow.

Closure of the chest is then accomplished by any method assuring an airtight seal and good healing. The lung should be reexpanded during closure by means of an intrathoracic catheter and under water seal. The catheter may be left in the chest for several days after the operation to drain the pleural space or permit the administration of antibiotics if indicated. Routine antibiotics and other postoperative treatments are given as indicated. Digitalization may be advisable if there is evidence of congestive failure.

An examination of the records of the Western Pennsylvania Hospital, a 500-bed general hospital in Pittsburgh, shows that in two years there were 20 cases in which death occurred in the operating room or within a three-day postoperative period in which the anesthetic might have been a factor. In only 6, however, could the condition be called cardiac arrests. This is no more than seems to have been true for previous years. During this period 16,000 anesthetics were given. These were on almost all of the various services, including neurosurgery, ophthalmology, gynecology, urology and general surgery. In 11 instances cardiac massage was attempted; in only 2 did it appear to be cessful. In 2 the chest was open massage begun within three minu

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◆

Given the sacred hunger and proper preliminary training, the student practitioner requires at least three things with which to stimulate and maintain his education, a note-book, a library, and a quinquennial brain-dusting.

—*Osler*

Hepato-Enterostomy

ICHIO HONJO, M.D., AND CHISATO ARAKI, M.D., F.I.C.S.*

KYOTO, JAPAN

IN case of a tumor in the hilar region of the liver or of a congenital defect of the extrahepatic biliary ducts, one cannot adopt any surgical procedure that has hitherto been applied to stenosis of the extrahepatic biliary system for the purpose of overcoming the accompanying jaundice; therefore, one is obliged to establish a new biliary passage, using intrahepatic ducts.

In 1912, Lameris[1] introduced this idea into practice for the first time and successfully performed an anastomosis between the cut surface of the liver and the jejunum. Following him, other workers presented several devices in this line.[2] But these interventions were not accepted as the procedure of choice, since the majority of surgeons at that time considered the operative risk too great.[3]

Encouraged by the fact that an anastomosis between the cut surface of the pancreas and the jejunum has recently become a matter of common usage, it occurred to us that an anastomosis between the liver and the jejunum could safely be performed in the same way in order to introduce the stagnant bile directly into the jejunum.

In a recent publication, Longmire[4] and Wilson[5] described an operative procedure called "partial hepatectomy with intrahepatic cholangiojejunostomy" and succeeded in attaining the same purpose. Our method, here presented, is somewhat different from theirs.

REPORT OF A CASE

A 46-year-old man was admitted to our hospital on May 8, 1952. He stated that he had observed a gradual onset of jaundice and general weakness for the past two months. About one and a half months prior to admission he noticed that the urine had become darker, the stools lighter and the eyes yellowish. At the same time the skin began to itch, and a local physician told him that his liver had been enlarged. Prior to admission the stools had become distinctly clay colored. The patient had had no abdominal pain or appreciable rise in temperature. His recent loss of weight amounted to about [illegible] Kg.

He was well built and [illegible] nourished. The temperature, pulse and respirations were normal. The skin appeared distinctly yellowish and showed numerous scratches. The abdomen was nontender, and a smooth, nontender liver edge was palpable about 2 cm. below the costal margin. There were no further abnormalities. The application of Courvoisier's law gave negative results.

Gastrointestinal barium studies revealed no pathologic change.

Laboratory studies showed that the blood count and the hemoglobin level were about normal; the value for total blood proteins was 7.51 Gm. per hundred cubic centimeters, with an albumin-globulin ratio of 1.16; the prothrombin value was 80.3 with vitamin K administration; the icterus index of the serum after Meulengracht was 140; Takada's serum reaction was double positive. The stools were clay colored and solid, with no occult blood; the urine contained no urobilinogen.

All of the evidence favored a diagnosis of obstructive jaundice, probably due to a tumor situated proximal to the junction of the cystic and hepatic ducts. On May 14 the first operation was done.

First Operation (Fig. 1).—With the region under spinal anesthesia, the abdomen was entered through a right subcostal incision. There was no free fluid in the peritoneal cavity. The liver was moderately enlarged, not cirrhotic but dark.

The gallbladder was shrunken and c
the hilar region. Moreover, a part of th
tum adhered tightly to this area, mak
anatomic situation very obscure. Th

From the First Surgical Division, Kyoto University Medical School Hospital (Doctor-in-Chief, Chisato Araki).

*Professor of Surgery, Kyoto University, Japan

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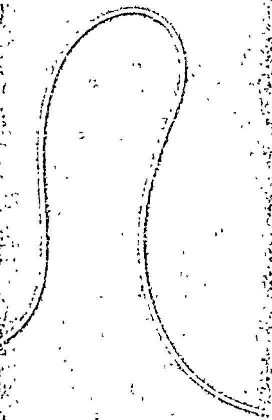

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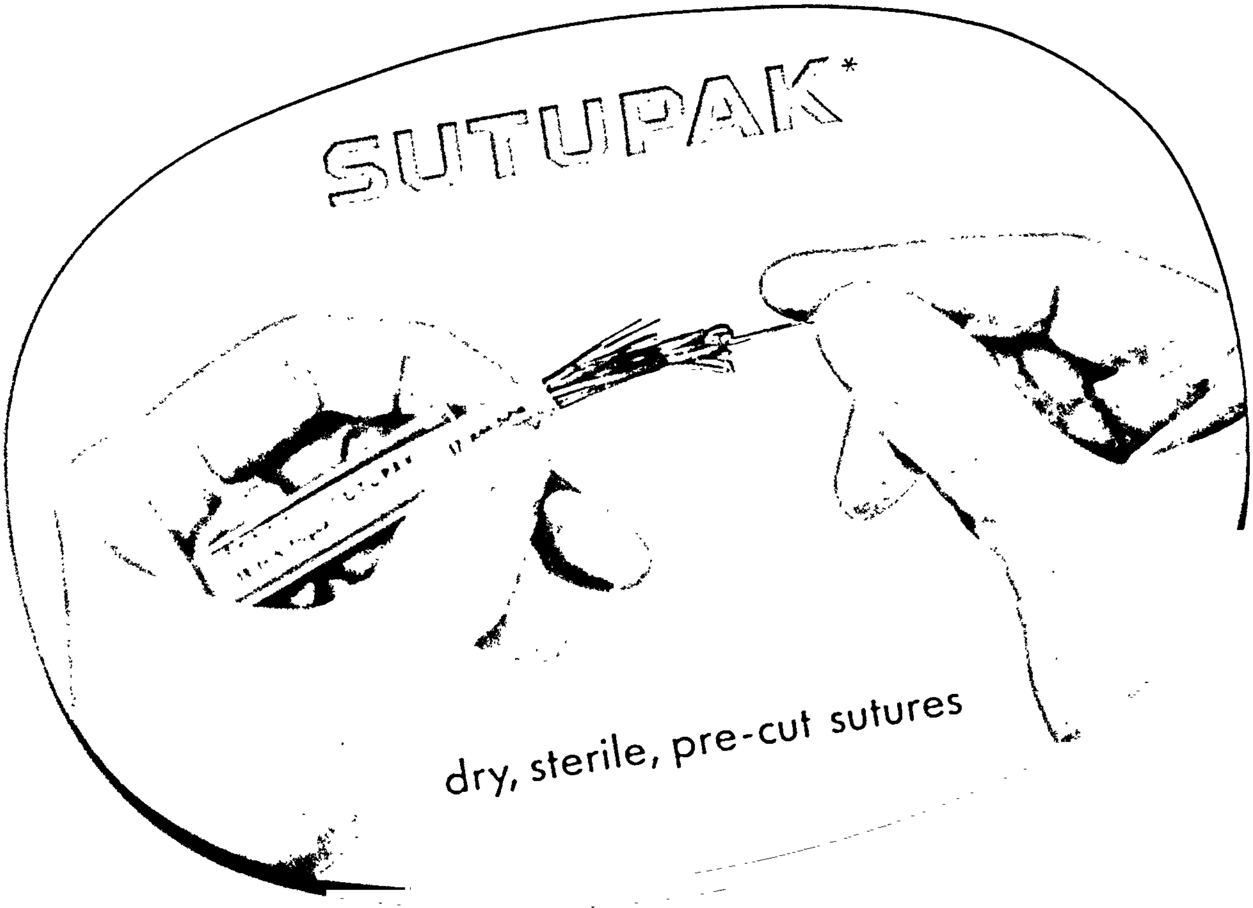

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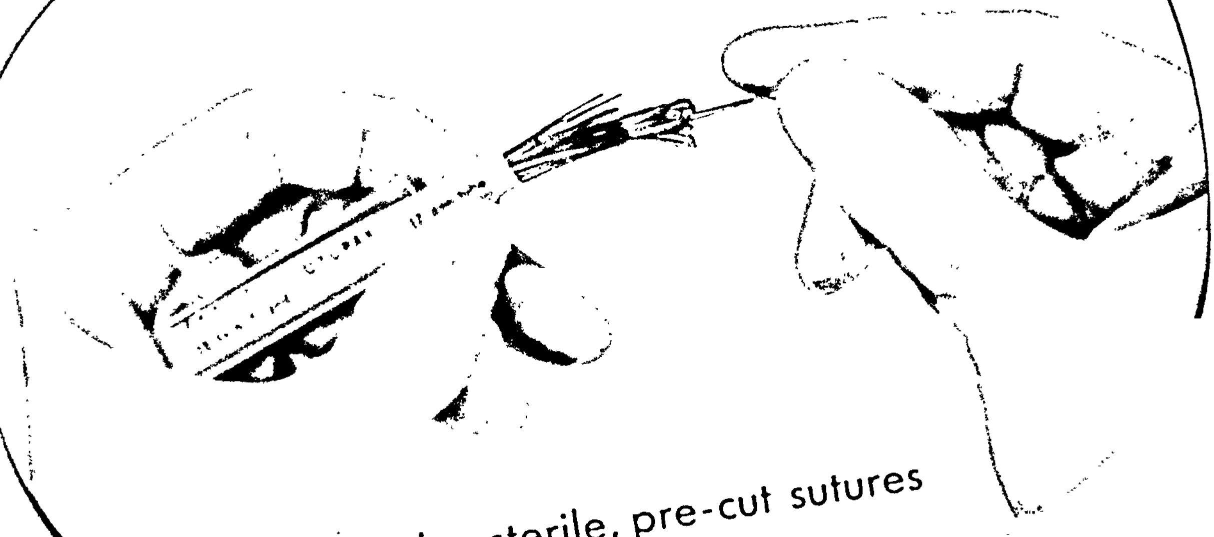

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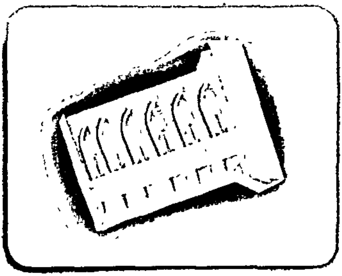

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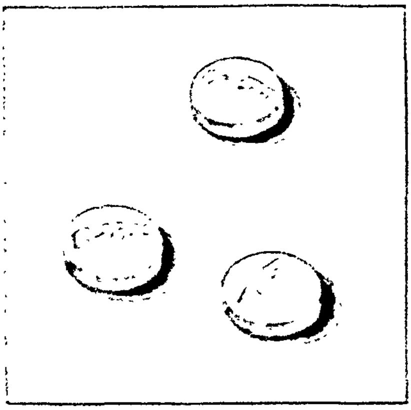

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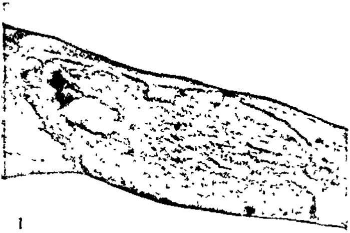
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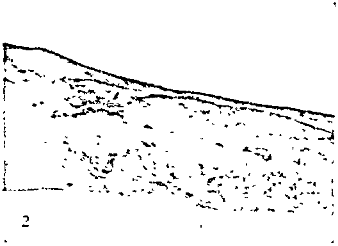
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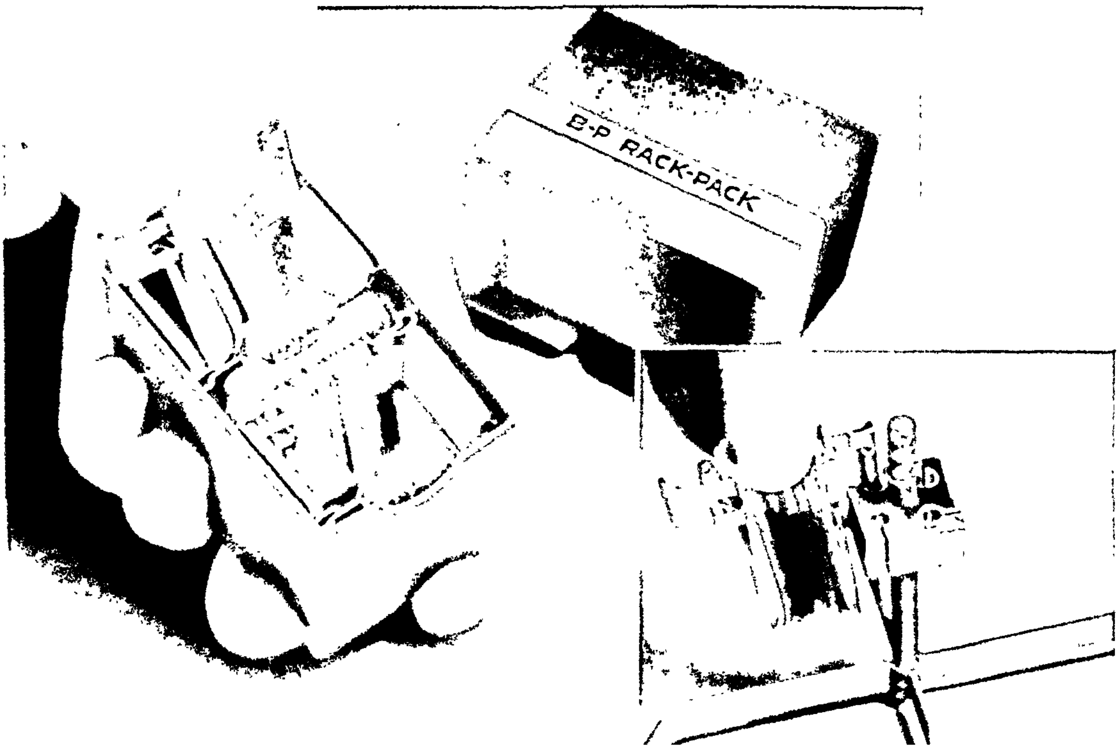

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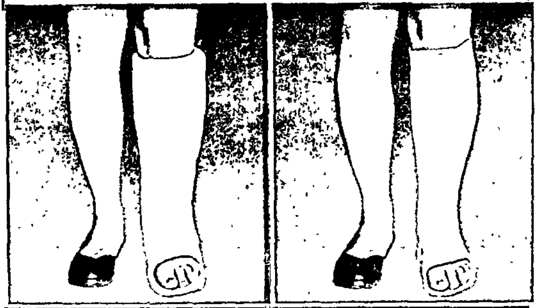

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1. A. W. Spittler, Col., (M.C.), U.S.A., J. J. Brennan, Lt. Col., (M.C.), U.S.A., J. W. Payne, Capt., U.S.A.F. (M.C.), American Academy of Orthopedic Surgeons, Jan. 26-31, 1952, Chicago, Illinois.
2. M. C. Cobey, M.D., F.A.C.S., Professor of Orthopedic Surgery, Georgetown University and Senior Attending Orthopedic Surgeon, Children's Hospital, Washington, D. C., The American Surgeon, Vol. XVIII, No. 4, April, 1952, pp. 413, 415.
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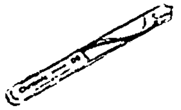

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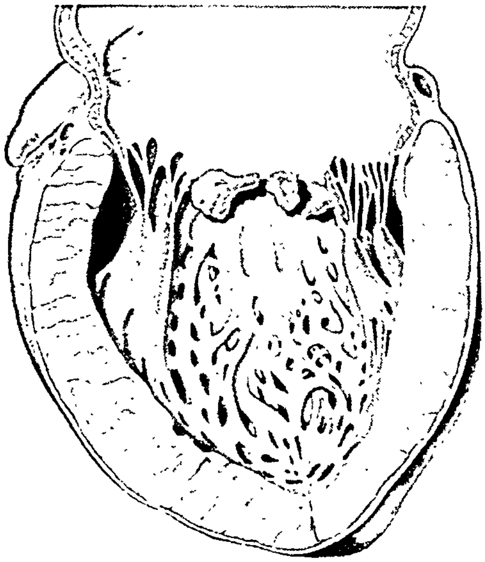

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1. Wellman, W. E.: *Postgrad. Med.* 12: 167, August 1952.

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2. Turell, R.: New York St. J. M. 50:2282, 1950
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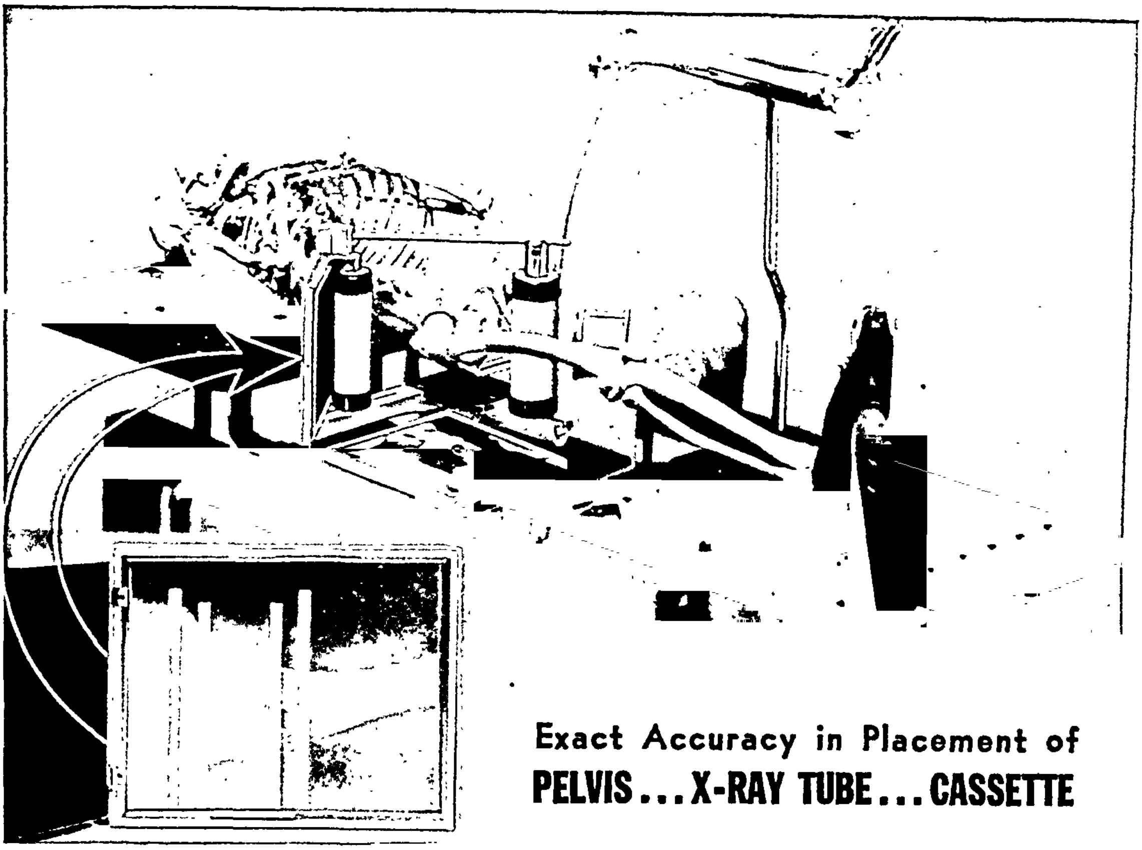

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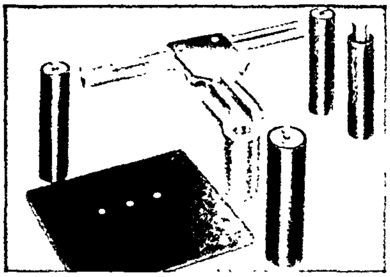

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Vol. XX NOVEMBER, 1953 No. 5

Original Articles

Achalasia of the Cricopharyngeal Sphincter

N. ASHERSON, M.A., M.B.B.S. (London), F.R.C.S. (Eng.), F.I.C.S.*
LONDON, ENGLAND

SERENDIPITY—the chance observation of an unexpected phenomenon in the course of an investigation directed to another purpose—is not an uncommon experience of the scientific research worker in clinical medicine. Observations made here conform to this type.

During the past fifteen years at my clinics, routine pharyngograms have been taken in all cases of laryngeal disease, not only for tuberculous laryngitis and new growths of the larynx but for neurologic conditions such as unilateral or bilateral paralysis of the recurrent laryngeal nerve. In this last category the pharyngograms accumulated slowly and only at long intervals. However, when they were compared, a common roentgenologic picture could be determined—one which also coincided with that first observed by me as a sequel to an anterior poliomyelitis pharyngeal lesion and termed "achalasia of the cricopharyngeus"—the subject of this contribution. The diagnosis of the syndrome rests on a characteristic profile roentgenogram (pharyngogram) of the region.

Achalasia of the cricopharyngeus in the past has invariably masqueraded under the sobriquet of "vallecular dysphagia," first described by Brown Kelly. I venture to proffer a new interpretation of this well-recognized lesion, which occurs with sufficient frequency to merit the many papers on the subject, in Great Britain by Brown Kelly (1919 - 1936), Patterson (1919), Mollison (1928) and McGibbon and Mather (1938); in the United States by Mosher (1927); in Holland by Gerlings (1935), and in France by Montandon (1948).

Deglutition· Terminal Phase—Normal Mechanism: A swallowed bolus has to pass the Scylla of an open glottis (with the risk of inhalation into the air passages) and the Charybdis of a closed pharyngoesophagus (with a risk of impaction in the swallowing passages), if it is to traverse, rapidly and smoothly, the length of the esophagus.

---

*Honorary Fellow of the Surgical Academy of Madrid.

Read at the Eighth International Congress of the International College of Surgeons, at Madrid, Spain, May 1952

Submitted for publication Aug. 5, 1952.

Two extremely rapid laryngeal and pharyngo-esophageal reflex neuromuscular mechanisms precede the passage of a swallowed bolus traversing the pharynx and hypopharynx during the terminal stage of deglutition. Both are almost instantaneous,* being completed in under 20 microseconds (Kemp and Ardran, 1951). These deglutitory spearhead reflexes produce (1) complete closure of the glottis** and (2) relaxation of the cricopharyngeal sphincter. Thus the swallowed bolus is prevented from being inhaled into the air passages, and its unhampered and instantaneous passage into the esophagus is facilitated.

Cineradiographic study (Russell Reynolds) demonstrated that a swallowed radiopaque bolus flashes instantaneously through the completely relaxed cricopharyngeal sphincter and that only when the level of the aortal arch is reached is there a perceptible momentary hitch before it passes on. A cineradiographic procedure exposing 30 frames a second (Saunders and others, 1951) indicates that three thirtieths of a second is required for the advancing edge of the bolus to pass from the level of the tip of the vertical epiglottis to the cricopharyngeal sphincter.

The aforedescribed mechanism is the *normal one*, the prime motivating motor nerves being those of the pharyngeal plexus incorporating both spinal accessory and both vagi nerves and including the recurrent pharyngeal nerves.

For this coordination, i. e., relaxation of the cricopharyngeal sphincter, to occur, the entire neuromuscular arc (of the pharynx, the laryngopharynx and pharyngo-esophagus) must be intact and possessed of full physiologic function. Any lesion that breaks this neuromuscular chain and permanently interferes with, impedes or prevents the instantaneous synchronous transmission of the wave of neuroperistalsis down the lower part of the pharynx will prevent synchronous opening of the mouth of the esophagus. This will result in incoordination or achalasia of the cricopharyngeal sphincter.

Abnormal Mechanism: Pavlov, in his classic experiment, divided both vagus nerves in the dog and observed that the upper end of the esophagus remained tightly constricted. Sjoberg (1950) repeated this experiment in the cat and then introduced into the esophagus an opaque bolus. He observed that when the cat was held up vertically by its tail, with the head dependent, the bolus was held up by the constricted cricopharyngeus; when the animal was held up vertically by its head the bolus hitched up at the cardia. These experiments indicate that division of both vagi results in tight constriction of both the upper and the lower end of the esophagus.

Now analogous lesions, partial (i. e., unilateral) or complete (i. e., bilateral), do occur in man. Cardiospasm or achalasia of the *cardia* is well known; achalasia of the cricopharyngeal sphincter also occurs, and, though this condition has been long familiar to the laryngologist, it has hitherto, when recognized, masqueraded under the erroneous title of vallecular dysphagia.

Location of the Break in the Reflex.—The break may be (1) in the pharyngeal plexus or musculature (anterior poliomyelitis); (2) in the musculature alone (after partial pharyngectomy); (3) in the nerves supplying the cricopharyngeus sphincter (paralysis of the recurrent laryngeal nerve, unilateral or bilateral), or (4) in the vagi (bilateral paralysis of the vagus nerve or bulbar paralysis).

Achalasia of the Cricopharyngeal Sphincter.—Achalasia*** of the cardia, i.e., cardiospasm, occurs at the *exit* of the esophagus. The cardiac sphincter fails to

---

*The neural stimulus motivates the pharynx. Does the refractory period coincide with the "paralytic period" during which the glottis is closed and the cricopharyngeus relaxed?

**If this breaks down, a bolus may be aspirated into the glottis, and if impacted there may suffocate the patient. Cases are known of sudden complete asphyxia occurring in an adult when a lump of meat has become impacted in the glottis and produced rapid death from asphyxia.

***A word coined by Sir Cooper Perry in 1914 for "absence of relaxation" and introduced into the medical literature by Sir Arthur Hurst (*A Twentieth Century Physician*, p. 55).

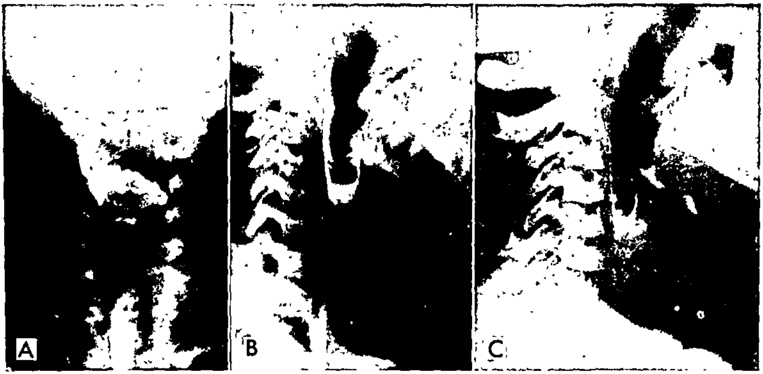

Fig. 1 (Case 1).—Complete achalasia of the cricopharyngeus: bilateral nerve block due to pharyngeal paralysis after anterior poliomyelitis in a child aged 12. *A* and *B*, immediate pharyngograms. *C*, pharyngogram taken five minutes later, profile view. Accumulation is still present in the hypopharynx.

relax reflexly and in synchronous coordination ahead of the oncoming bolus at its arrival in the lower end of the esophagus. The dysphagia associated with cardiospasm, though usually slight, can be severe in certain cases. It is relieved when the esophageal contents empty into the stomach, whether *gradually* by the "drip feed" pressure of the "test tube" of dammed-up esophageal contents above the unrelaxed sphincter, or *suddenly* by vomiting or by esophageal lavage. Achalasia of the pylorus has recently been described by Williams (1950); bilateral vagotomy will also produce it.

An analogous syndrome is here described, occurring at the *entrance* to the esophagus, i. e., at the exit or lower end of the hypopharynx, and termed achalasia of the cricopharyngeal sphincter. The incoordination of this sphincter is a manifestation of the failure of the cricopharyngeal sphincter to relax synchronously with the arrival of the swallowed bolus at the lower end of the pharynx en route from the pharynx to the esophagus.

This condition may be clinically symptomless, though it is always demonstrable roentgenologically. The usual symptom may be mild dysphagia; the severe (even complete) type of dysphagia is encountered in the presence of bilateral paralysis of the recurrent laryngeal nerve. In the early stage the difficulty is more marked in taking fluids than when solid foods are ingested.

Achalasia of the cricopharyngeus is not uncommon if diligently and deliberately sought for in the presence of the known cause. In the presence of achalasia of the cricopharyngeal sphincter there is partial or complete failure of, as well as a delay in, the relaxation of the sphincter. There is neither mechanical obstruction nor stenosis. Normally, with each act of deglutition this sphincter relaxes completely and instantaneously, ahead of the oncoming projected swallowed bolus passing from the pharynx to the esophagus. If this fails to take place, achalasia results. The lesion is permanent.

Roentgen Picture: In the profile pharyngogram the lower (post-cricoid) half of the hypopharynx is permanently relaxed, patent and patulous. It is not tonically constricted, as is usual, and when it is observed together with the no [illegible] patent upper half of the hypo there is produced the roentgen effect of marked elongation of the hypopharynx.

The laryngeal cartilaginous skeleton slopes away from the posterior pharyngeal wall, and both valleculae are marked and prominent (Fig. 1*B*). These details are brought out in a profile roentgenogram of the hypopharynx after an opaque cream has been swallowed, when the characteristic holdup of the bolus is observed above the cricopharyngeus; this results in stagnation in the hypopharynx with secondary overflow or retention, filling the valleculae. In a case of severe involvement—e. g., a case in which the condition is due to bilateral paralysis bilateral of the recurrent laryngeal nerve, the opaque cream is splashed all over the pharynx and the glottis.

A column of swallowed boli piles up in the hypopharynx above the sphincter, and this reservoir acts as a "drip feed" to the esophagus. Traces of it may still be observed after an interval of five minutes; i. e., there is great delay before the pharyngeal contents empty into the esophagus.

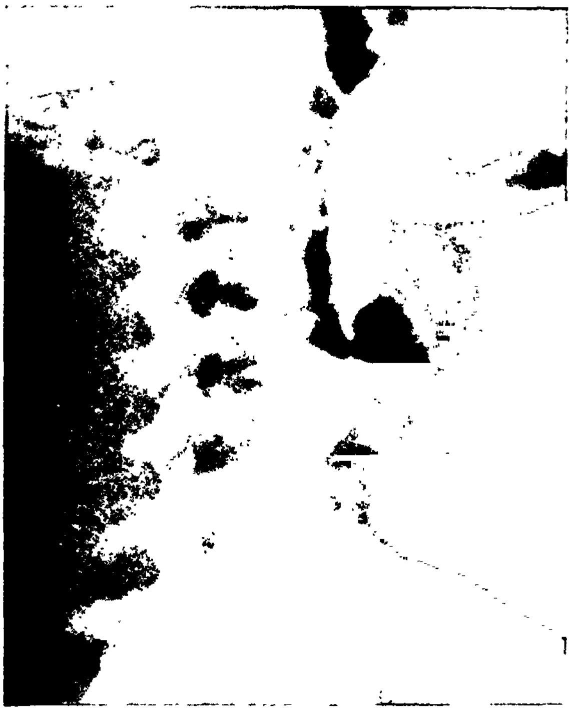

Fig. 2 (Case 2).—Pharyngogram showing achalasia of the cricopharyngeus occurring after anterior poliomyelitis and affecting the pharyngeal musculature in a woman aged 26.

The muscular wall of the hypopharynx sags but does not become hypertrophied. This is similar to what happens to the esophageal wall in a case of cardiospasm.

Anteroposterior films taken after a swallow of an opaque medium show two small semilunes adjacent to each other at the midline, with a horizontal "fluid level" (Fig. 1*A*). These are in the vallecula and are at the level of the space between the third and fourth cervical vertebrae.

In the lateral (profile) view also, small semilunar shadows are observed. The opaque meal stagnates and may remain *in situ* in the hypopharynx for as long as five minutes.

Achalasia of the cricopharyngeus has been confused with vallecular dysphagia, in discussing which Barclay (1933) wrote, "The existing cause probably lies in some minor and unrecognized injury that disturbs the balance of the swallowing mechanism, just as calcification of the cartilage may be the starting-point of a disorder of deglutition." The pharyngograms here reproduced support his views.

The condition is never observed in association with a pharyngeal pouch or with a postcricoid or hypopharyngeal carcinoma.

McGibbon and Mather (1933), after testing 100 normal persons, failed to discover any holdup of the opaque medium in the hypopharynx. This agrees with my experience. On the other hand, Gerlings and Den Hoed (1935) stated that 9 out of 20 normal men examined had more or less clearly perceptible stagnation.

Lesions Producing Cricopharyngeal Achalasia.—Achalasia of the cricopharyngeus has been encountered in association with the following lesions, of which case records and pharyngograms are attached:

1. *Interference with the neuromuscular mechanism of the pharynx* (postanterior poliomyelitis). The cricopharyngeal sphincter functions, but the nerve stimulus fails to reach it during the terminal stage of deglutition.

2. *Bilateral pharyngeal neuromuscular pharyngeal lesions due to anterior polio-*

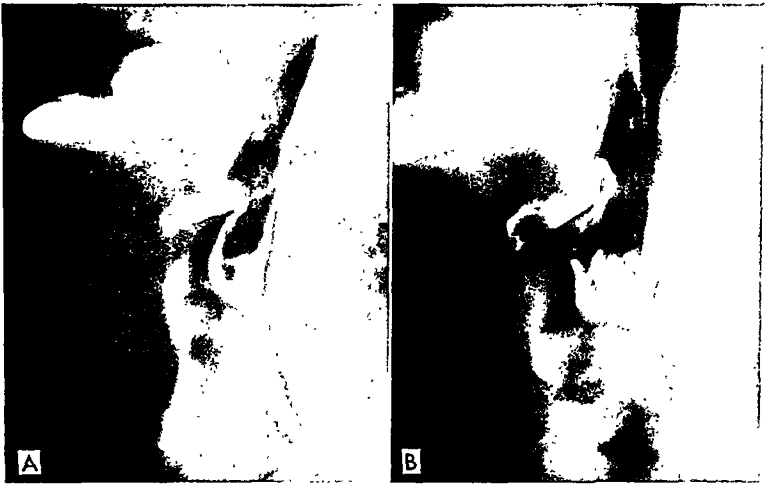

Fig. 3 (Case 3).—Achalasia of the cricopharyngeus; thyrotoxic myopathy of pharynx. *A*, peroperative profile view: note swelling of thyroid. *B*, profile view taken after three minutes, showing stagnation still present.

myelitis in the young. "The cardinal features of anterior poliomyelitis have been epitomised as spasm of the muscle, incoordination and mental alienation" (Seddon, 1952; Cases 1 and 2).

3. *Thyrotoxicosis myopathy, involving the pharyngeal musculature* (Case 3).

4. *Conditions in which the neuroperistaltic wave does reach the cricopharyngeus sphincter unimpeded, but the sphincter fails to relax owing to paralysis of the recurrent laryngeal nerve, which motivates this sphincter.* Two types of such conditions occur: those caused by unilateral and those caused by bilateral paralysis of the recurrent nerves.

In this group the roentgen picture of achalasia of the cricopharyngeus is so consistently observed that the characteristic pharyngogram may be used as a means of confirming or excluding the presence of a clinically observed or suspected unilateral or bilateral paralysis of the recurrent laryngeal nerve.

Paralysis of the cricopharyngeus sphincter is either *partial*, associated left or right paralysis of the recurrent laryngeal nerve in the middle-aged, or *complete*, with bilateral recurrent laryngeal nerve paralysis.

In the presence of unilateral paralysis of the recurrent nerve, achalasia of the cricopharyngeus is usually latent. Only by close cross-questioning can one elicit any disturbance in swallowing, but this is always present, though in a slight degree.

The achalasia is the result of a broken reflex arc due to failure of the cricopharyngeal sphincter to open in sequence. Paralysis of even one recurrent laryngeal nerve is sufficient to break the reflex nerve chain. The sphincter fails to open, and the swallowed bolus enters a hypopharynx with a closed exit and remains there for some time.

5. A break in the chain by a segmental incision across the pharynx, i. e., after

partial pharyngectomy. A segment of the pharynx is cut across, including the chain of nerves.

6. Bulbar paralysis in the elderly (central lesion).

Mosher (1927) has published some profile roentgenograms of this condition occurring (*a*) in association with bulbar paralysis, and (*b*) after paralysis of the pharynx due to anterior poliomyelitis. Mollison (1928) has recorded observations on dysphagia due to pharyngeal paralysis.

Montandon (1948) described the case of a man aged 59, with myoporphyria, in whom increasing dysphagia developed. This was due to complete stenosis at the mouth of the esophagus. There was atrophy of the muscles "in this region," but not of the neuromuscular elements. The diagnosis was "myopathic obstruction," and the lesion was a permanent, progressive entity as contrasted with neurovegetative spasm, which is intermittent and benign.

In Montandon's opinion the obstruction was one due to spasm, in contrast to the view proposed in this paper of "achalasia," i. e., failure to relax.

Pondering on this list of known associations with achalasia of the cricopharyngeus does lead to the inference that cardiospasm also results from a paralytic lesion of the lower part of the esophagus caused by anterior poliomyelitis or virus infection akin to it, e. g., herpes zoster of the sympathetic ganglia. The relation between herpes zoster and anterior poliomyelitis has been discussed by Parkinson (1948).

Achalasia is *not* like paralysis of the esophagus. Complete paralysis of the esophagus is manifest roentgenologically (i. e., in an esophagram) by a completely patulous upper third of the esophagus (Barclay).

CLINICAL PICTURE

A swallowed bolus is propelled into the upper part of the esophagus as far as the arch of the aorta, where it becomes stuck, lingers, and with repeated swallowing is gradually pushed below the level of the clavicle and the arch of the aorta. Once this level is passed, the bolus passes on in the normal manner.

The clinical picture is apparent on mirror examination of the hypopharynx, which is filled with an accumulation of frothy saliva. This may be excessive and may even, as in Brown Kelly's case (1936), be regurgitated out of the mouth. It may overflow into and irritate the larynx, producing a cough, especially when the paralysis of the recurrent laryngeal nerve is bilateral.

An accumulation of secretions in the hypopharynx and valleculae is usual in the presence of a pharyngeal pouch or a postcricoid carcinoma, and any such diagnosis must be excluded.

Clinical Types.—Excluding the readily discernible causes of dysphagia at the entrance to the esophagus (stricture, pouch, neoplasm) and taking into account the unusual nonmalignant causes, the incidence of achalasia of the cricopharyngeus is not particularly rare. It is essentially a roentgen diagnosis, and is likely to be overlooked unless the characteristic roentgen picture is recognized.

The Latent Type: Achalasia of the cricopharyngeus may be clinically latent, discovered only by roentgen diagnosis. The patient may be known to have a permanent neuromuscular lesion (e. g., paralysis of the pharynx, which may occur after infantile paralysis as in Cases 1 and 2). In such a case the latent (and probably slight) disturbance of deglutition—which may or may not amount to actual dysphagia—has been compensated for. Close cross-examination, however, will invariably disclose some disturbance of deglutition.

Of "vallecular dysphagia" Brown Kelly wrote: "Slight cases are seen by the radiologists and by laryngologists, who look for this, but patients with pronounced symptoms are very rare."

The pharyngeal paralysis associated with postanterior poliomyelitis is of this type. On roentgen examination it is also observed in association with permanent unilateral paralysis of the *recurrent laryngeal* nerve. This nerve, in addition to motivating the vocal cord (the abductor) must simultaneously motivate the cricopharyngeal sphincter.

Profile roentgenograms (Fig. 1, *B* and *C*) are here presented to show the typical roentgen picture of achalasia of the cricopharyngeus. As these plates were viewed in retrospect, it is not possible to say whether the patients suffered any disturbance or deglutition. It was probably absent or, if present, so slight as not to obtrude on the patient's consciousness.

According to Mollison (1928), in patients with unilateral paralysis of the soft palate, pharynx, laryngeal nerve and larynx, the interference with deglutition is almost always trifling.

This type may be designated as the latent or silent type, with a typical roentgen picture observed by routine roentgen examination for some other pharyngeal lesion.

The Dysphagic Type. Cases of this type have been recorded in the literature under various headings: secondary vallecular dysphagia (Brown Kelly, McGibbon and Mather); dysphagia atonica (Holsknecht, 1910); and pseudospasm of the mouth of the esophagus (Montandon, 1948).

Mild dysphagia or discomfort, with the subjective feeling of a persistent foreign body in the throat, is the leading symptom. As a rule dysphagia is not complete, even if the patient says it is. He can always swallow his saliva. In the presence of bilateral paralysis of the abductor the severe dysphagia, especially, for liquids is a predominant feature.

The dysphagic type is associated with *bilateral* paralysis of the recurrent laryngeal nerve. There is inspiratory stridor on the slightest exertion, and when the patient *swallows fluids* he coughs after a short latent interval. Solids go down without difficulty, but later even solids cannot be swallowed. After a tracheotomy is performed for bilateral abductor paralysis, swallowed fluids immediately come out

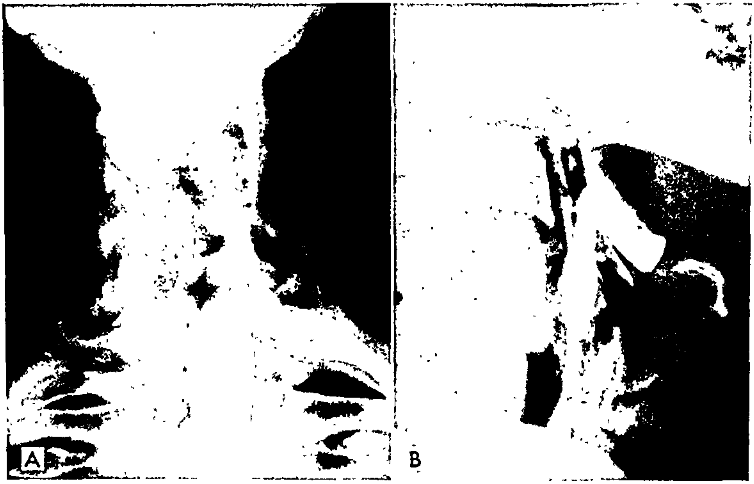

Fig. 4 (Case 4).—*A*, anteroposterior pharyngogram in a case of achalasia of the cricopharyngeus. Right recurrent laryngeal nerve paralysis due to gunshot wound. Note bullet *in situ*, producing paralysis of the cricopharyngeus sphincter. *B*, profile view.

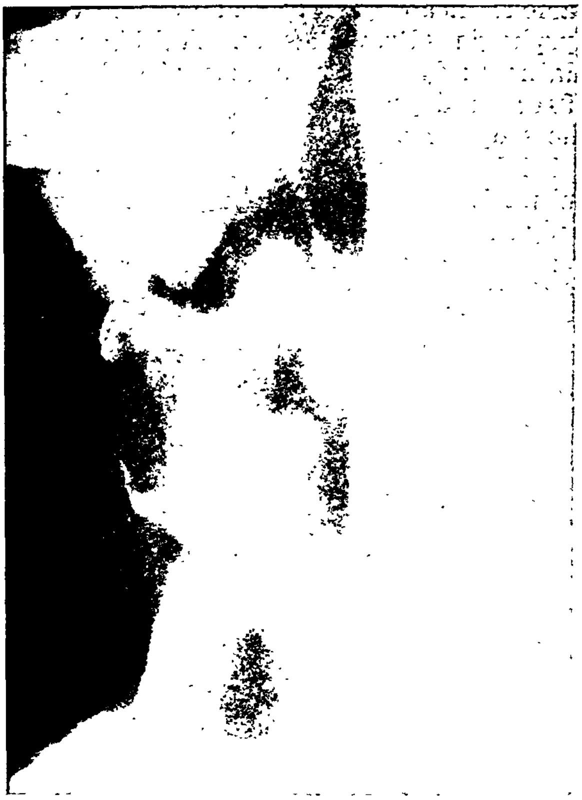

Fig. 5 (Case 5).—Profile film of pharynx in a man aged about 60, with left recurrent laryngeal nerve paralysis. Note widening and elongation of the pharynx. Widening of the valleculae was also observed.

of the tracheotomy tube. Unless this is treated, inhalation pneumonia will develop and kill the patient. A large Hirst's bougie can be passed. Saliva also overflows into the trachea from the hypopharynx. Gastrostomy may be necessary.

Physical signs other than stagnation or delay are absent. Endoscopic study fails to reveal ulcer or organic stenosis. The condition must not be confused with a postcricoid web or simple stricture. The profile and anteroposterior pharyngograms show the characteristics of achalasia of the cricopharyngeus.

The condition must be differentiated from (1) idiopathic dysphagia in the women, (2) sideropenic dysphagia, (3) dysphagia due to carcinoma of the hypopharynx or the postcricoid region, or (4) an unsuspected impacted foreign body within or without the lumen of the esophagus.

The dysphagic type of achalasia of the cricopharyngeus must be distinguished from the other, more frequent causes of vague dysphagia.

No other of these lesions produces the same profile pharyngogram. In fact, the pharyngogram in the presence of achalasia is pathognomonic.

Case 1.—(*Neuromuscular lesion, a sequel to anterior poliomyelitis; achalasia of the cricopharyngeal sphincter*).—In this case achalasia of the cricopharyngeal sphincter followed postanterior poliomyelitis. The patient, a girl aged 12, was smitten with anterior poliomyelitis, which affected the pharynx. There was difficulty in swallowing, with marked stagnation and increasing accumulation of frothy saliva in the pharynx, producing bubbly, noisy respirations. The child phonated hoarsely and with difficulty, but there was no respiratory obstruction. The frothy saliva was removed by constant suction, a nasal catheter and a pharyngeal suction tube being used. Recovery was uneventful. The pharyngogram was taken some months later. The dysphagia was slight.

The pharyngograms in Figure 1 show achalasia of the cricopharyngeus. *A* and *B* were taken immediately; *C*, five minutes later (profile view). There is still an accumulation of secretion in the hypopharynx. The roentgenologist reported that the barium swallow had shown that difficulty in swallowing was shown to lie in the act of deglutition. Movement of the tongue and upward movement of the pharynx as a whole were impaired and showed abnormally deliberate. In addition, there was failure to close the nasopharynx and to approximate the anterior and posterior pharyngeal walls at the level of the base of the tongue. Below the level of the upper end of the true esophagus no abnormality was seen. Thus it appeared that weakness of the intrinsic and extrinsic musculature was involved in the normal pharyngeal movements.

Case 2.—*Achalasia of the cricopharyngeus in a patient with postanterior poliomyelitis due to paralysis of the pharyngeal plexus.*—Mrs. J., a woman aged 26, had paralysis of the pharyngeal plexus following anterior poliomyelitis. There was a large collection of frothy saliva in the valleculae and the hypopharynx. The patient did not spontaneously complain of dysphagia. The roentgenogram (Fig. 2) shows the characteristic hold-up of food in the hypopharynx.

This patient was reexamined roentgenologically one year later and the same achalasia was demonstrated, there being still more than fifteen minutes' delay in emptying the pharynx. The clinical picture, too, on mirror laryngoscopic study, was unchanged. This case is similar to a case described by Mollison (J. Laryng. & Otol. 43:772, 1928) in which the lesion, in a woman of 84, was caused by bulbar paralysis.

Comment.—Cases 1 and 2 suggest the cause of cardiospasm. It may be a sequel to an attack of anterior poliomyelitis confined to the lower part of the esophagus and affecting the esophageal plexus.

Acute dilatation of the stomach* is a common complication in those cases of acute anterior poliomyelitis in which paralysis is sufficiently severe and of a type to require the use of the iron lung (respirator). In such cases it is associated with general atrophy of the gastrointestinal tract, resulting from involvement of the autonomic nervous system.

Is this due to incoordination between the gastric peristalsis and the pyloric sphincter "achalasia" of the pylorus?

CASE 3 (*Achalasia of the cricopharyngeus caused by thyrotoxic myopathy of the pharyngeal musculature, associated with bilateral paralysis of the thyroarytaenoideus muscle*).—A woman aged 72 had a thyroid adenoma, the size of a hen's egg, in the right lobe. The trachea and esophagus were displaced to the left. There was no tracheal compression. The patient complained that her voice had been husky for months. She had also had difficulty in swallowing, and said that, although she could not swallow any food, she could swallow her saliva easily. She had lost considerable weight.

Mirror pharyngoscopic study showed a stagnant accumulation of secretion in the hypopharynx and bilateral paralysis of the thyroarytenoideus internus muscles. The myopathic condition was secondary to thyrotoxi-

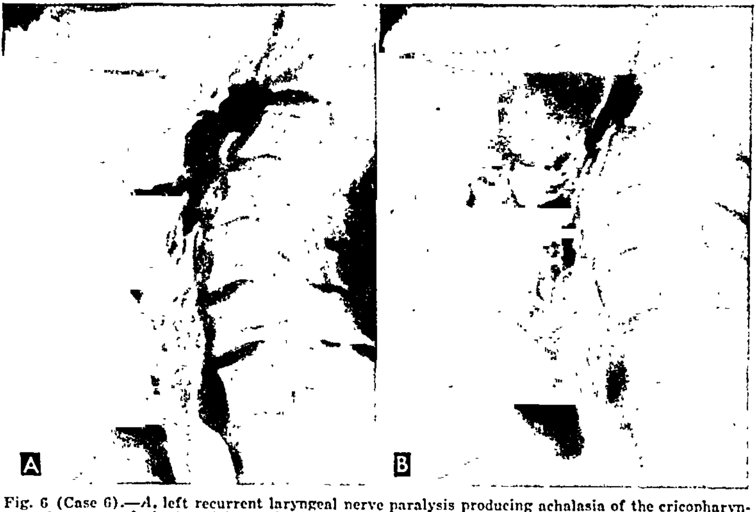

Fig. 6 (Case 6).—*A*, left recurrent laryngeal nerve paralysis producing achalasia of the cricopharyngeus due to paralysis (partial) of the cricopharyngeal sphincter. *B*, pharyngogram taken after 5 minutes.

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*Brit. M. J. April 1, 1950, p. 797.

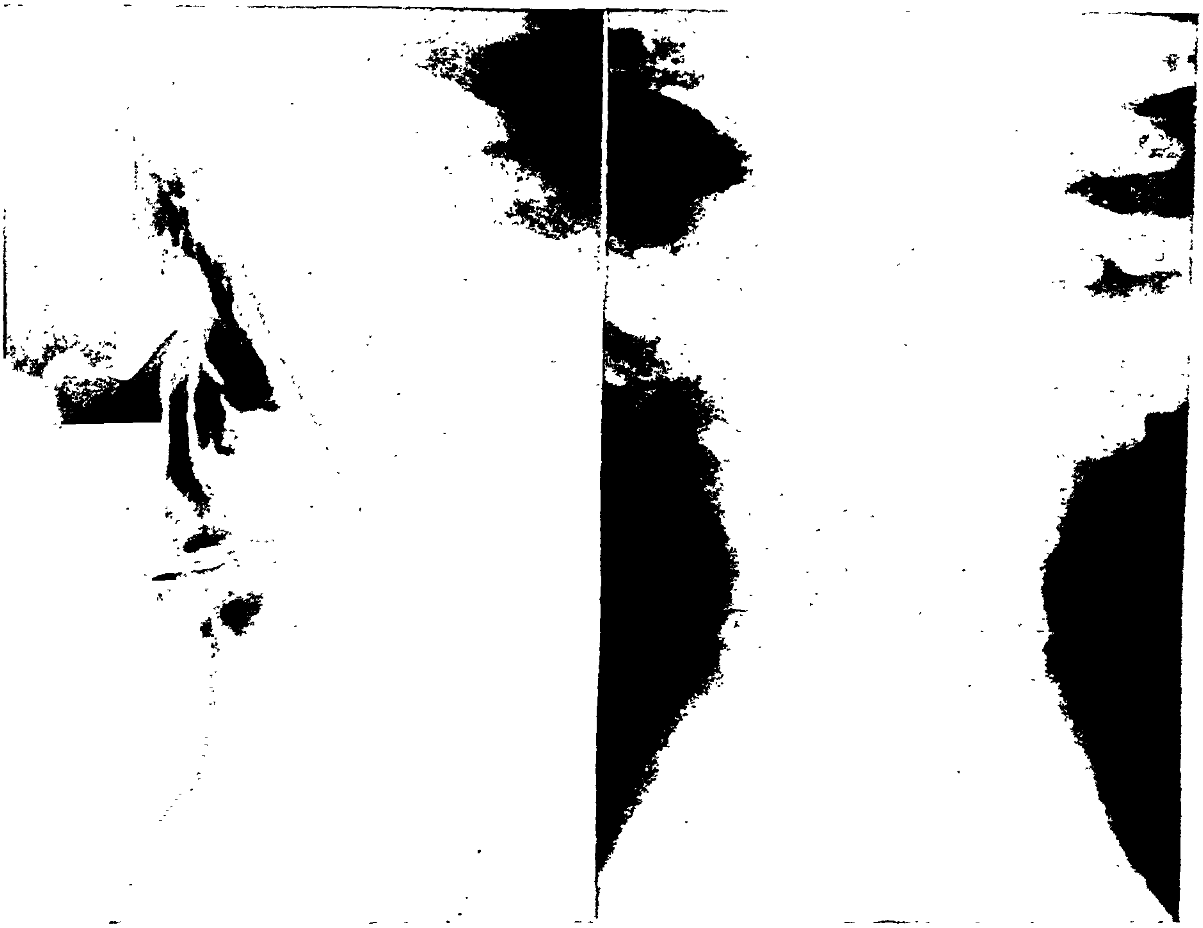

Fig. 7 (Case 7).—Bilateral recurrent laryngeal nerve paralysis producing achalasia of the cricopharyngeus due to paralysis of the cricopharyngeal sphincter (complete, bilateral). *Left,* profile pharyngogram. *Right,* anteroposterior view.

cosis. Neurologic examination revealed no abnormality.

The roentgen picture was characteristic (pharyngogram).

Esophagoscopic study revealed a normal esophagus. The blood count was normal. The patient improved after the esophagoscopic procedure. After removal of the thyroid swelling the dysphagia subsided.

Achalasia of the Cricopharyngeus Due to Unilateral Paralysis of the Recurrent Laryngeal Nerve.—In the following cases of unilateral paralysis of the recurrent laryngeal nerve an examination was made of the profile roentgenogram taken after the patient had swallowed an opaque cream (Figs. 4 and 5).

In 3 cases in which the left recurrent laryngeal nerve was paralyzed, the same profile pattern of cricopharyngeal achalasia was observed when the region was examined roentgenologically after an opaque bolus had been swallowed.

Paralysis of the Right or Left Recurrent Laryngeal Nerve.—In 1 instance (Case 4) in which the right recurrent laryngeal nerve was severed by a bullet through the neck, the same picture was observed in the pharynx (Fig. 4).

CASE 4 (*Achalasia of the cricopharyngeus, produced by paralysis of the right recurrent laryngeal nerve due to gunshot wound (bullet shown in situ in Figure 4*).—A man aged 30, who did not complain of any dysphagia, showed the characteristic hold-up of food in the hypopharynx and valleculae. indicating achalasia of the cricopharyngeus.

CASE 5 (*Achalasia of the cricopharyngeus* *due to paralysis of the recurrent laryngeal nerve)*.—The patient was a man aged 60. Note the elongation and widening of the hypopharynx (Fig. 5) and the patulous lower half of the hypopharynx, which is normally tightly closed.

There was widening of the valleculae. No dysphagia was complained of.

CASE 5a.—Another case similar to Case 5 is included in the series.

CASE 6 (Fig. 6).—The patient had paralysis of the left vocal cord due to a mediastinal lesion. There was no dysphagia, and esophagoscopic study revealed no obstruction. Note the striated opaque shadow in the pharynx as observed in an esophagram of a patient with achalasia of the cardia (cardiospasm).

Achalasia of the Cricopharyngeus Due to Bilateral Paralysis of the Recurrent Laryngeal Nerve.—The severest form of achalasia of the cricopharyngeus results from bilateral paralysis of the recurrent laryngeal nerve.

CASE 7 *(Complete achalasia due to bilateral paralysis of the recurrent laryngeal nerve)*.—A man aged 65 suddenly lost his voice. Inspiratory stridor developed and was discovered, on examination six weeks later, to be caused by bilateral paralysis of the laryngeal nerve, with both vocal cords immobilized in the paramedian position. The patient also had difficulty in swallowing *fluids*, which, after a latent interval of a few seconds, precipitated a bout of coughing, while swallowed solids passed down easily. He had lost weight. A blood cell count showed 3,500,000 red cells per cubic millimeter, with 76 per cent hemoglobin. Roentgen examination showed the chest to be clear.

An opaque swallow showed a typical hold-up above the cricopharyngeus, with sloping away of the larynx and overflow into the valleculae, both of which were filled with the opaque cream, displaying a fluid level. There was no obstruction in the esophagus. (After a few weeks the cause was found to be a bronchial carcinoma of the upper lobe of the left lung. The case was reported in the *Journal for Diseases of the Chest*, March 1952).

Two weeks later, after the tracheotomy performed because of the stridor, swallowed liquids produced coughing and much of the fluid came out through the tracheotomy opening. The obstruction due to spasm of the cricopharyngeus was such that the swallowed bolus of opaque material rolled back over the glottis
and into the vallecula, with prolonged st
tion. An esophageal feeding tube coul
passed without difficulty, and feeding w
gavage. This indwelling esophageal tube
duced much salivation which could n
swallowed, overflowed into the larynx
coughed up and through the tracheotomy
ing (Fig. 7C).

CASE 8.—A similar case, the patient
a man aged 60 with an identical lesion
due to carcinoma of the lung) was obse
Complete achalasia of the cricopharyn
was produced (Fig. 8).

CASE 9.—The patient, a man aged 71,
a husky voice, with the right vocal cord
There was paralysis of the right recu
laryngeal nerve (Fig. 8).

Achalasia of the cricopharyngeus was
ent. There was no dysphagia, and eso
goscopic study gave negative results.

CASE 10.—Achalasia of the cricopharyn
following partial pharyngectomy (Fig. 9)
present.

The patient had part of his pharynx ex
by lateral pharyngotomy, with immediat
construction of the pharynx. The ulcer

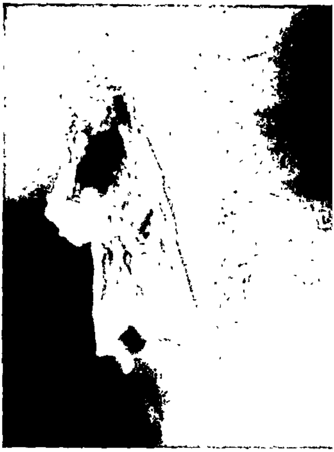

Fig. 8 (Case 8).—Bilateral recurrent laryn
nerve paralysis producing achalasia of the cr
pharyngeus due to complete bilateral paralys
the cricopharyngeal sphincter. Swallowed l
were regurgitated through the tracheotomy

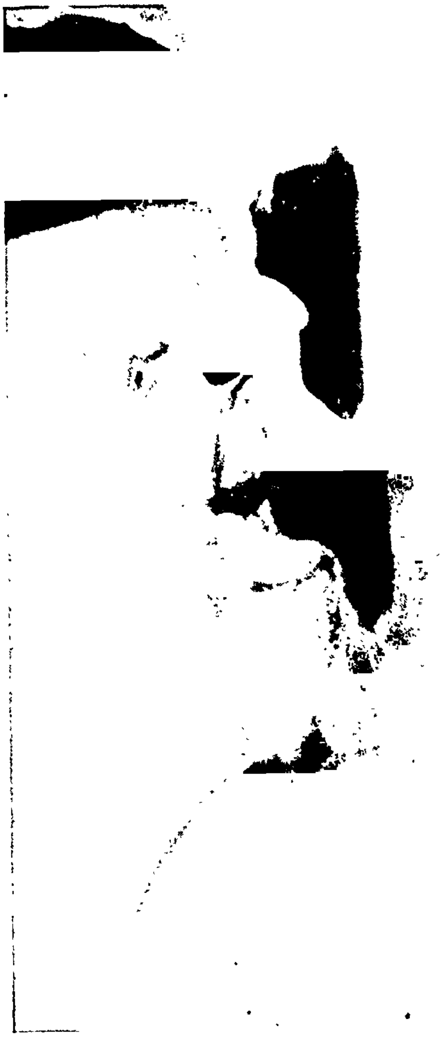

Fig. 9 (Case 10).—Achalasia of the cricopharyngeus caused by partial pharyngectomy.

on the tonsil posterior faucial pillar and base of the tongue. There was no paralysis of the vocal cord. A gland dissection was performed.

The present condition is as follows: there is is a large collection of frothy saliva in the hypopharynx. This produces coughing on swallowing and slight dysphagia.

SUMMARY

A characteristic syndrome is described, manifested by a characteristic pharyngogram: it is produced by incoordination (i.e. achalasia) of the cricopharyngeal sphincter. Various causes are enumerated, with relevant case records.

Any lesion—whether muscular, neuromuscular or neurogenic—that hampers, interferes with, or prevents the advance of the microperistaltic wave down the pharynx ahead of a swallowed bolus during the act of deglutition will produce the syndrome of achalasia of the cricopharyngeus. Paralysis of the pharyngeal plexus after anterior poliomyelitis, unilateral or bilateral recurrent laryngeal nerve paralysis, or segmental section of the pharynx (after partial pharyngectomy) are the common causes.

RESUMEN

Se describe un síndrome característico manifestado por un faringograma típico producido por incordinación (acalasia) del esfínter cricofaríngeo. Se enumeran diversas causas con una relación de casos al respecto.

Cualquier lesión perturbadora, sea neuromuscular, muscular o neurogénica que interfiere o previene la propagación de la onda microperistáltica hacia abajo en la faringe y delante del bolo alimenticio produce el síndrome de acalasia del cricofaríngeo. Son causas comunes, la parálisis del plexo faríngeo después de la poliomielítis anterior, la parálisis del nervio recurrente, sea unilateral o bilateral y la sección segmentaria de la faringe.

ZUSAMMENFASSUNG

Es wird ein charakteristisches Krankheitssyndrom, das ein typisches Roentgenbild des Pharynx ergibt und durch mangelhafte Koordination des M. cricopharyngeus (Achalasie, Unfaehigkeit des Sphincters zu entspannen) zustande kommt. Es werden verschiedene Ursachen mit einschlaegigen Krankheitsgeschichten angefuehrt.

Jede Erkrankung, gleichgueltig ob muskulaerer, neuromuskulaerer oder neurogener Art, die den Ablauf der einem geschluckten Bissen voranlaufenden mikroperistaltischen Welle den Schlund hinunter beeintraechtigt, behindert oder unmoeglich macht, kann das Syndrom der Achalasie des M. cricopharyngeus hervorrufen.

Zu den gewoehnlichen Ursachen gehoeren die Laehmung des Rachenplexus bei Kinderlaehmung, einseitige oder doppelseitige Rekurrenslaehmung und die Querdurchtrennung des Rachens bei partieller Pharyngektomie.

SUMÁRIO

Umã sindrôme caracteristica é descrita, evidenciada por um faringograma tipico: é causada por incoordenacão (por exemplo, acaláde) do esfincter cricofaringêo. Muitas causas são citadas com o registro de casos relacionadas com essa sindrôme.

Qualquer lesáo,-seja muscular, neuromuscular ou neurogênica- interfere ou evita o desenvolvimento dos movimentos microperistalticos do faringe, na descida do bôlo alimentar durante o áto da deglutição, produzindo a sindrôme de acalase do esfincter cricofaringêo. A paralizia do plexo faringêo após poliomielite anterior, paralizia unilateral ou bilateral recurrente do nervo laringêo, ou a secção segmentar do faringe (após faringectomia parcial) são as causas comuns da sindrôme.

RIASSUNTO

Viene descritta una sindrome caratteristica che si manifesta con un tipico faringogramma; è prodotta dalla incoordinazione (acalasia) dello sfintere cricofaringeo. Ne vengon elencate le varie cause e descritti casi tipici.

Qualunque lesione—muscolare, neuromuscolare o nervosa—che ostacoli, disturbi o impedisca la progressione delle onde microperistaltiche della faringe, che accompagnano un bolo alimentare durante l'atto della deglutizione, può produrre la sindrome della acalasia del cricofaringeo. La paralisi del plesso faringeo dopo poliomielite anteriore, la paralisi uni- o bilaterale del ricorrente, la resezione segmentale della faringe (dopo faringectomia parziale) sono le cause più comuni della sindrome.

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Cancer and Heredity

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THE idea that cancer is a hereditary disease and that its manifestations are subject to mendelian laws has found many adherents. R. Remak (1854), Paget (1855) and many others propagated the hereditary theory. Its main representatives, however, were Cohnheim (1877) and H. Ribbert (1904). According to these authors, disseminated embryonic cells are the causes of cancer. This view is based on histologic observations on teratomas of ovaries, testicles, branchiogenic cancers, so-called congenital displacement of hypernephromas in the liver, etc. Thus far nobody can explain why these misplaced cells or malformations should undergo a malignant change into cancer decades after birth, and lie dormant for such a long time. Nobody knows what factors cause the malignant transformation. The idea that one gene is necessary to make an individual person a victim of cancer has many adherents among geneticists. J. B. S. Haldane (1933) characterized this idea as ludicrous. Nevertheless, clinicians, pathologists and surgeons accept the theory of heredity, on the basis of laboratory experiments. Experimental cancer research has produced evidence that chemical and physical agents, roentgen rays, radium and aniline dyes are causes of cancer. These experiments are based on Virchow's irritation theory. These cancers produced by external agents are, however, preventable, and 90 per cent are curable.

Protection is possible against "professional cancers" — roentgen ray, radium, petrolatum, tar, aniline and traumatic cancers; for instance, the Kashmir skin and the betel nut cancer. Geneticists have so far not maintained that roentgenologists or mule skinners have inherited a special gene for their profession. These skin cancers are environmental and not hereditary diseases.

What about the spontaneous cancers of internal organs? Can surgeons accept the hereditary origin of these spontaneous cancers? If they do, then the question arises, how can an operation influence genes or destiny? Would it make any difference whether such a cancer is operated on early or six months later?

There is, of course, a strict indication for operation on some cancers, whether their origin is considered hereditary or not. Danger of hemorrhage, of perforation, and of esophageal or intestinal obstruction provide strict indications for surgical intervention. To accept the hereditary theory, especially that of Cohnheim or Ribbert, and still to advocate "early operation" on internal organs is quite a different problem.

The purpose of this paper is to prove that cancer is not a hereditary disease and that it is not caused by misplaced embryonic cells but by toxic agents carried in the bloodstream to different organs.

One who studies the official cancer death rates by organ and by sex in 1947 and 1948 will find, according to Peller (1952), that 186,568 male and 185,392 female patients died of cancer in the United States. Comparing these figures with those of previous years, one comes to the conclusion that the cancer mortality rate within a certain period and within a certain country does not change; it remains constant. In spite of great changes in organ distribution, the mortality rate for male and female patients remains, according to Peller's tables, constant at the rate of 129

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and 127 respectively (per 100,000 persons). About 80 per cent of the adult male population of the U. S. A. died of malignant disease of the esophagus, the stomach, the rectum, the pancreas, the liver or the biliary system. *These cancers are distributed over organs of metabolism and originate in the organs draining into the portal vein.* In analysing Peller's statistical data for the female, one finds that the death rate is not very different from the male's; only a shift in the organ distribution of cancer has taken place, characterized by a high incidence of cancer in the uterus and the breast. In my own book "The Liver": Porta Malorum (1950) and in a paper published in 1942, I have tried to prove that the uterus has to be considered from the menarche till the climacteric as an organ of metabolism. The nidation of the fertilized germ cell in the mucosa of the uterus occasions the development of an organ, the placenta, which becomes the source of nutrition for the fetus. The latter passes its waste products into the maternal blood via the placenta. *The placenta is the liver, lung and* intestine of the fetus.

One of the first symptoms of pregnancy is the dusky discoloration of the vagina, the labia majora and the mons veneris, due to the dilation of veins, which indicates even in the first two weeks of pregnancy that some circulatory changes are taking place in the uterus and in the genital organs.

With the development of the placenta a hepatopetal inversion of the venous blood flow from the uterus comes into operation. The liver is the detoxicating organ of the mother's metabolism. *It is generally accepted that the uterus drains its venous blood into the inferior caval vein.* Is it not probable that nature has devised some means by which the metabolic toxins of the uterus and the fetus enter the liver directly via the portal system? Changes in the direction of the blood stream ante partum and post partum occur in fetal life, and they occur in the genital organs of both male and female, physiologically and pathologically. I have dealt with this problem in detail (1932-1950). Nobody can deny that the uterus during the child bearing period becomes, functionally, an organ of metabolism, providing food and oxygen for the fetus and detoxicating its waste products. Taking this fact into account, one concludes that not 80 per cent but 90 per cent of all cancers of the adult population originate in the organs of metabolism.

In children, 15 to 20 per cent of all malignant diseases (including leukemia) occur, according to Peller, in the brain and 7 to 9 per cent in the kidneys and adrenals. Sarcomas account for 31.6 per cent, leukemia for 42 per cent. The liver and the bile ducts participate only to the extent of 1.3 per cent. *In other words, more than 90 per cent of all malignant growths in children originate outside the organs of metabolism.* The circulation of blood in children is different from that of adults. Lung, liver, bile ducts, pancreas and intestine have no physiologic function ante partum. Although the umbilical vein is a branch of the portal vein, there is no need for its blood to be detoxicated by the liver. Therefore nature has provided a by-pass, the venous duct of Arantius, through which the purified maternal blood can enter directly from the caval vein into the general circulation of the fetus. After birth the function of the placenta ceases and the mother no longer provides food and oxygen for the infant via the uterus; her breasts take over the nutritional functions. Metabolism of the infant starts, and metabolic products or even toxins from the child's intestine enter the portal circulation and the liver. The liver of the infant now has to detoxicate and assimilate foreign products. The venous by-pass must therefore be obliterated, to prevent the entrance of metabolites not yet assimilated into the general circulation. *This obliteration of the venous duct of Arantius post partum can be considered as evidence that nature prevents the entrance of unassimilated metabolic products into the general circulation.* One should therefor not be surprised that a similar mechanism has been provided for the mother herself and that a change in the direction of the maternal blood stream hepatopetally does actually occur at the beginning of pregnancy. Further evidence can be provided that this change of the blood stream from the portal into the caval system takes place. Boyd, in his textbook of pathology, has described observations in the liver in the presence of eclampsia, stating: "The necrosis (in the liver) is peripheral in type being most marked around the portal vein . . . Syncytial *masses from the placenta may be present in this area.*" (The italics are mine.) In what other way can such syncytial masses of the placenta reach the liver except via portacaval anastomoses in a hepatopetal direction?

There are many other facts providing evidence for preexisting portacaval shunts coming into operation in the presence of portal hypertension. The so-called Kruckenberg tumor of the ovaries has been and still is a riddle to clinicians and pathologists. This tumor represents a metastasis of a gastric cancer to the ovaries. Many fictitious theories have been advanced in the past to explain how cancer cells from the stomach can be carried, by-passing other organs, into the ovaries. The answer is, they are carried via portacaval shunts into the ovaries as a result of the inversion of the portal blood stream, a familiar symptom, known as Caput Medusae, in cases of hepatic cirrhosis, piles and varicose veins of the legs (Blond, 1932).

What is the correct interpretation of this peculiar distribution of malignant change in adults and children?

If cancer is due to dissemination of embryonic cells, why this peculiar distribution? Disseminated cells can be carried and deposited in different organs by the blood stream, but why, in 90 per cent of cases, they are deposited in organs drained by the portal vein—in other words, in the metabolic organs of adults—is a riddle which the theory of Cohnheim cannot explain. In childhood the embryonic cells had presumably to be carried via the umbilical vein, the venous duct of Arantius, the right heart, foramen ovale, left heart, arterial duct of Botallus, into the aorta and deposited in the brain, muscles, bones and hemopoietic organs. This distribution of cancer represents another riddle. Are the embryonic cells coming from the fetus or the mother, or is one dealing with something completely different from cells? Before this question is answered, some other puzzling peculiarities of cancer distribution must be considered. Cancer of the uterus and the breasts is practically unknown in girls before the menarche. These organs do not yet function, and function involves a greater supply of blood. According to Peller, 58 per cent of all cancers in the female originate in the genital organs. Another puzzle must be solved. If one is dealing with disseminated embryonic cells, why do cancers of the uterus and breasts not occur before the first menstruation? During the child-bearing period the incidence of cancer of the uterus goes up. The more pregnancies, the higher the death rate from cancer of the genital organs. After the menopause, a change of life which is again *characterized by circulatory changes,* the incidence of cancer of the uterus decreases and cancer of other organs (e. g., the biliary system) and the breast increases. After the menopause, obliteration of portacaval shunts cuts off the uterus permanently from the portal circulation. Against the physiologic inversion of the portal blood flow during pregnancy one could raise the following objection: Why does the uterus not belong to the portal system, if this is important for its metabolic function during the child-bearing period? The answer is: This intermittent drainage of the uterus into the portal system is of importance only for the time when the uterus has to perform metabolic functions, but not before puberty and not after the menopause. The economy in the drainage of organs hepatopetally is of the highest interest. The intestinal tract and the organs participating in metabolism drain into the liver, with two exceptions: *The esophagus and the lowest part of the rectum belong to the caval system, because they represent only passages for food or its remnants and do not participate in absorption and metabolism.*

According to Peller's statistical data, among women with genital cancer who had never been pregnant, 44 per cent have cancer of the cervix and 56 have cancer in other parts of the genital organs. In women with one pregnancy, 68 per cent have cervical cancers and 32 per cent have cancers affecting other parts. With the increasing number of pregnancies the proportion is constantly going up, until for women with 8 to 20 pregnancies the corresponding figures are 84 per cent to 16 per cent. "In total cancer incidence, nullae gravidae were neither better nor worse off than women with one pregnancy." This riddle can be explained by vascular changes during pregnancy. The cervix represents the most rigid part of the uterus before the first pregnancy. One of the first and most reliable signs of pregnancy is the sign of Hegar, the softening of the cervix in the region of the internal os, *due to an increase in the blood supply.* The elongated cervix becomes softer and shorter until it is dilated to such an extent that the head of the infant can pass through. Vascularization increases constantly from the fourth week of pregnancy, and portacaval shunts dilate. As a rule the muscles of the uterus become hypertrophied, whereas the tonus of muscles of the cervix decreases. The contractibility of the uterus increases; that of the cervix decreases. During the involution period of the uterus the uterine musculature seals off the preexisting portacaval shunts, whereas the cervix does not contract completely. As the number of pregnancies increases, the muscles of the cervix are damaged and scarred, providing just the environment in which cancer thrives. The weaker cervix muscles cannot completely seal off the preexisting portacaval shunts after the first pregnancy.

Another vascular change in the male physiologic picture also has a bearing on the distribution of cancer. The male climacteric starting above the age of 50, is *characterized by vascular changes in the corpora cavernosa;* the vasa afferentia become permanently or partly obliterated, interrupting the male sexual life in a manner analogous to the female menopause. *This change in circulation in the sexual organs of the male results in a rapid increase of the mortality rate of cancer of the prostate.*

The peculiarities of cancer distribution, namely, the occurrence of 90 per cent of cancers of the adult population in the organs of metabolism and of 90 per cent of malignant diseases of childhood in organs with no relation to metabolism, have not only to be explained; they may even help to solve the problem of cancer. *The changes in distribution of primary cancers follow distinct vascular changes corre-*

TABLE 1.—*Deaths from Cancer Among the White Population of the United States in 1947 and 1948, Classified by Organ and Sex**

	Male	*Female*
Buccal cavity and pharynx	8,468	2,094
Respiratory system	27,168	6,967
Esophagus	4,955	1,399
Stomach	29,532	17,827
Urinary organs	11,843	6,169
Rectum	11,500	8,522
Pancreas	8,641	6,217
Leukemia and aleukemia	8,305	6,020
Skin	4,105	2,739
	4,282	2,711
	19,889	23,686
	8,621	11,131
Genital organs (including prostate)	22,746	40,572
Breasts	401	34,364
Other and unspecified organs	16,112	14,974
All organs	[illegible]	185,392
Rate f[illegible] per [illegible]	[illegible]	127

*All age groups.

TABLE 2.—*Number of Pregnancies in Relation to the Site of Origin of Cancer in the Genital Organs**

Number of Pregnancies	*(a) Cervix*	*(b) Percent of Cancer in Other parts of the Genitals*	*(c) a and b*
0	44	56	100
1	68	32	100
2 and 3	74	26	100
4 to 7	79	21	100
8 to 20	84	16	100

*Women of all age groups; University Hospital, Vienna.

sponding to certain physiologic phases of life. These observations and statistical data allow the *formulation of a simple law* of cancer distribution. *The distribution of spontaneous cancers of internal organs depends on distinct physiologic phases in the circulation of the blood.* One may distinguish, therefore, the following circulatory phases:

Phase 1.—Both sexes: Fetal blood circulation, with characteristic distribution of cancer in childhood. Ninety per cent of cancers arise in organs unrelated to fetal metabolism, as yet out of function.

Phase 2.—Adults, both sexes: Ninety per cent of cancers arise in organs connected with metabolism, in organs drained by the portal vein.

Phase 3.—Prior to first menstruation: Cancers of the uterus and breast are practically unknown in girls, these organs being out of function.

Phase 4.—Childbearing period: Intermittent uterine drainage into the portal system. Fifty-eight per cent of cancers arise in the genital organs of women, a characteristic shift as compared with the incidence of cancer in men.

Phase 5.—(a) Female postmenopausal period: Obliteration of portacaval shunts; obliteration of vasa afferentia of the uterus; cancer of the uterus decreasing, cancer of the breast and other organs increasing. (b) Male climacteric: Cessation of function of the corpora cavernosa (obliteration of vasa afferentia); rapid increase of cancer of the prostate.

CONCLUSIONS

1. As external cancers are caused by the action of chemical irritants on normal tissues that are not the sites of misplaced embryonic cells, there is no reason to believe that cancers of internal organs are caused by different agents.

2. The irritants causing cancers of internal organs are carried by the blood stream to the organs of distribution. They are not cellular elements.

3. Hereditary theories, including the theory of Cohnheim and Ribbert that cancer arises from disseminated embryonic cells, are wrong. No genes are responsible for cancer, which is caused by environmental agents.

4. The fact that, in spite of a different cancer distribution among male and female patients, the death rates for the two sexes are nearly equal provides evidence that cancer must be caused by some metabolic toxin carried by the blood stream to different organs, but originating from an external source affecting the two sexes of a given country in the same way.

5. In adults, 90 per cent of cancers originate in the organs coordinated in metabolism. This leads to the conclusion that the toxin responsible for cancer may be a metabolic toxin.

6. In children, about 90 per cent of cancers do not arise in the organs of metabolism. This may lead to the conclusion that the toxins entering the general circulation via the umbilical vein are derived from the maternal placenta, the latter being a metabolic organ during the childbearing period.

Therefore, 90 per cent of all malignant growths take origin from organs of metabolism.

RÉSUMÉ

1. Puisque les cancers externes sont consécutifs à une action chimique irritative des tissus normaux, il n'y a aucune raison de nier la même étiologie pour les cancers des organes internes.

2. Les substances irritanes qui amènent le cancer des organes internes sont apportées par le flot sanguin a ces mêmes organes.

3. Les théories de l'hérédité et celles de Dohnheim et Ribbert sont fausses.

4. Même si les organes cancérisés varient d'après les sexes, les statistiques de mortalité sont les mêmes pour les deux sexes et prouvent donc la théorie de toxine métabolique apportée par le courant sanguin aux organes atteints de cancer.

5. 90% des adultes souffrant de cancer

sont atteints dans leurs organes qui sont en rapport avec le métabolisme: donc une toxine métabolique cancéreuse.

6. Chez les enfants, 30% des cancers ne viennent pas des organes métaboliques. Ceci peut faire conclure à l'hypothèse suivante: que les toxines cancérigènes arrivent aux organes des enfants au placenta de la mère par la veine ombélicale; le placenta est un organe métabolique de la gestation.

SCHLUSSFOLGERUNGEN

1. Da Krebse an der Aussenfläche des Körpers durch die Wirkung chemischer Reizstoffe auf normales Gewebe, das keine verschleppten embryonalen Zellen enthält, hervorgerufen werden können, liegt kein Grund vor anzunehmen dass Krebse der inneren Organe durch andersartige Stoffe verursacht werden.

2. Die Reizstoffe, welche Krebse an inneren Organen produzieren, gelangen auf dem Blutwege zu den Organen der Ausbreitung der Krankheit. Die Stoffe sind keine zellulären Elemente.

3. Die Vererbungstheorien, einschliesslich der Theorien von Cohnheim und Ribbert, dass Krebse aus verschleppten embryonalen Zellen entstehen, sind falsch. Krebse können nicht Genen zugeschrieben werden, sondern verdanken ihre Entstehung Reizstoffen, die im Milieu vorhanden sind.

4. Die Tatsache, dass trotz der verschiedenen Verteilung der Krebse auf Männer und Frauen die Sterblichkeit für beide Geschlechter fast gleich ist, beweist, dass der Krebs durch irgendein Stoffwechselgift hervorgerufen sein muss, das zwar auf dem Blutwege in verschiedene Organe transportiert wird, aber doch von einer äusseren Quelle stammt, der beide Geschlechter in einem Lande gleichmässig ausgesetzt sind.

5. 90 Prozent der Krebse der Erwachsenen entstehen in Organen, die am Stoffwechsel beteiligt sind. Das führt zu dem Schluss, dass das krebshervorrufende Gift ein Stoffwechselgift sein könnte.

6. 90 Prozent der Krebse bei Kindern entstehen nicht in den Organen des Stoffwechsels. Daraus kann man schliessen, dass die Gifte, die auf dem Wege über die Nabelschnur in den allgemeinen Blutkreislauf gelangen, aus der mütterlichen Plazenta stammen, die ja während der Schwangerschaft als Stoffwechselorgan funktioniert.

CONCLUSIONES

1. Los cánceres externos son producidos por la acción de químicos irritantes sobre los tejidos normales que no son sitio de células embrionarias ectópicas. No hay razón para creer que los cánceres de órganos internos son producidos por agentes diferentes.

2. Los irritantes que producen los cánceres de los órganos internos son llevados por la circulación sanguínea a los órganos de distribución. No son elementos celulares.

3. Las teorías hereditarias incluyendo la de Cohnheim y la de Ribbert, de que el cáncer se desarrolla de celulas embrionarias, son erróneas. No hay genes responsables del cáncer que es producido por agentes del medio.

4. El hecho de que a pesar de la diferente distribución cancerosa entre el hombre y la mujer el grado de mortalidad es casi igual en ambos sexos, prueba que el cáncer debe ser producido por alguna toxina metabólica llevada por la sangre a diferentes órganos pero originándose a partir de una fuente externa propia de la región y común a los dos sexos.

5. En los adultos el 90 por ciento de los cánceres se originan en órganos coordinados en el metabolismo. Esto lleva a la conclusión de que la toxina responsable del cáncer puede ser una toxina metabólica.

6. En los niños el 90 por ciento de los cánceres no se originan en órganos del metabolismo. Esto lleva a la conclusión de que las toxinas entrando a la circulación general por la vena umbilical se derivan de la placenta materna, siendo esta el órgano metabólico durante el embarazo.

CONCLUSIONI

1. Dato che i cancri esterni sono causati dall'azione irritativa di agenti chimici sui tessuti normali, che non sono sede di cellule embrionali dislocate, non vi è ragione di credere che i cancri degli organi interni siano causati da agenti differenti.

2. Gli agenti irritativi, causa del cancro degli organi interni, sono portati agli organi di distribuzione dalla corrente ematica. Essi non sono elementi cellulari.

3. Sono errate le teorie ereditarie, inclusa la teoria di Cohnheim e Ribbert, che il cancro si origini da cellule embrionali disseminate.

4. Il fatto che, a dispetto della differente distribuzione dei cancri nei maschi e nelle femmine, la mortalità sia pressocchè uruale nei due sessi, mette bene in evidenza come il cancro debba essere causato da qualche tossina metabolica, portata dalla corrente sanguigna in organi diversi, ma originatasi da un focus esterno comune ai due sessi.

5. Negli adulti il 90% dei cancri si originano negli organi devoluti al metabolismo. Questo porta alla conclusione che la tossina responsabile del cancro possa essere una tossina metabolica.

6. Nei bambini circa il 90% dei cancri non origina in organi del metabolismo. Questo può portare alla conclusione che le tossine, *entrando nel circolo generale* attraverso la vena ombelicale, vengano derivate dalla placenta, quest'ultima avendo, durante la gravidanza, funzione di organo metabolico.

CONCLUSOES

1. Partindo-se do principio de que os canceres externos sejam causados pela ação de irritantes quimicos sôbre os tecidos normais, não existem razões para se pensar que os canceres dos orgãos internos sejam produzidos por agentes diversos.

2. As substancias irritantes que causariam o cancer nos orgãos internos seriam transportadas por via sanguinea. Não existem elementos celulares.

3. As teorias da hereditariedade, inclusive deCohnhein e Ribbert, estão erradas.

4. O fato da existencia de distribuição diferente entre os sêres masculinos e femininos, as taxas de mortalidade nos dois sexos, são evidencia de que o cancer deve sêr causado por toxinas metabolicas transportadas pelo sistêma sanguineo.

5. Nos adultos, 90% do canceres originados nos orgãos internos estão ligados ao metabolismo.

6. Na criança se dá justamente o inverso, o que vem corroborar a opinião explanada pelo autôr.

Foreign Interns and Residents Available

Approved hospitals in the United States and Canada having openings for interns and residents are requested to communicate with the Secretariat of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Terminal Ileum Duplex

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AN abnormality of the terminal portion of the ileum which is not to be confused with the condition described by Sir W. Arthurbut Lane in 1911 is a kinking of the small bowel apparently caused by shortening or constriction of the posterior peritoneum as it reflects onto the mesentery of the ileum. The result is doubling of a section of the terminal portion of the small bowel. This condition I have called terminal ileum duplex.

Lane described a weak spot in the drainage system at the end of the small intestine (the ileum). The cecum, which is the blind extremity of the intestinal tract, tends to become displaced into the true pelvis, which it occupies to the inconvenience of other important structures. This tendency to fall is met as before by the crystallization of lines of strain. These form bands external to the cecum and ascending colon and fix these structures to the abdominal wall. The lowest secure the appendix and frequently cause it to kink, with the result that the portion beyond the kink distends and produces symptoms of varying severity which are lumped under the term "appendicitis."

The strain internal to the cecum comes upon the termination of the ileum and the posterior layer of the mesentery. In the latter region the layer of peritoneum is formed which kinks the ileum in two planes, one vertical and angular and the other due to torsion, the new ligament gradually extending over the peritoneal aspect of the affected loop of intestine.

These conditions were described in the British Medical Journal under the title *The Kink of the Ileum in Intestinal Stasis.*

Stein of New York summarized the observation of Lane, Flint, Conrad and Reid from an embryologic standpoint as to the causes of the kinking and stated that Lane's kink was observed in the last few inches of the terminal portion of the ileum and that the condition was caused by overdistention of the cecum resulting in prolapse.

In a previous paper I stated that there was an abnormality of the terminal portion of the ileum which may be responsible for symptoms similar to those of other abdominal conditions. It frequently becomes evident at operation but has not received its due attention from anatomists or surgeons contributing to the literature. This anomaly is a kinking of the small bowel at its terminal segment.

Lane, delivering a lecture at Guy's Hospital in 1911, stated, "One is appalled at the correspondence on a subject which lingers and then breaks out at intervals in the medical press." This statement may merit considerable thought, as there may be similarities between his original observation and the facts that I am attempting to emphasize here. However, in my experience the condition described and called "terminal ileum duplex" may occur as far as 20 inches (50 cm.) from the ileocecal valve and extend almost to its entrance, and the reflection or constriction of the posterior layer of peritoneum causing the duplex does not, in my opinion, conform to the band described by Lane and others as the cause of Lane's kink or of pericolic membrane obstruction.

The progressive development of ileum duplex is shown in the accompanying illustration, and although these are similar in form and location to Lane's kink, I had the artist illustrate the stages in this position

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†Deceased

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TABLE 1.—*Analysis of 44 Cases*

Patient	*Sex*	*Age*	*Previous Operations*	*Tentative Diagnosis*	*Ileum Duplex*		*Other Pathologic Conditions*
					Grade	*Distance from Valve, Cm.*	
1	F	37	Operation for recurring vagina fistula	Ileum duplex	3 +	12.5	Chronic appendicitis
2	M	23	Herniotomy	Acute appendicitis	1 +	15	Acute appendicitis
3	M	47	Appendectomy	Obstruction	1 +		
4	M	34			1 +	15	None; appendix normal
5	M	36		Appendicitis	3 +	7.5	Cat appendix
6	F	54	Hysterectomy and appendectomy	Obstruction	3 +	12.5	Obstruction
7	F	25		Appendicitis	1 +	15	None; appendix normal
8	F	22		Mesenteric glandular disease	1 +	17.5	None; appendix normal
9	F	36		Ileum duplex	2 +	25	None
10	F	28		Ileum duplex	1 +	20	None; appendix normal
11	M	55	Herniotomy and appendectomy	Possible peritonitis; peptic ulcer	2 +	25	
12	M	64		Cholecystitis	3 +	15	Appendiceal fibrosis; chronic infectious cholecystitis
13	F	29		Appendicitis	2 +	7.5	None; appendix normal
14	F	36	Pelvic procedure	Dystrophy	2 +	12.5	None; appendix normal
15	F	42		Obstruction	4 +	30	Chronic appendicitis
16	F	54		Appendicitis	3 +	30	Cat appendix
17	F	15		Appendicitis	3 +	15	Subacute appendicitis
18	F	30		Appendicitis	3 +	20	Cat appendix
19	M	52		Appendicitis	3 +	35	None; appendix normal
20	F	24		Appendicitis	3 +	12.5	Ovarian cyst; normal appendix normal
21	M	36	Cholecystectomy and appendectomy	Chronic appendicitis	4 +	40	Chronic appendicitis
22	F	21		Chronic appendicitis	5 +	20	None; appendix normal
23	F	25	Appendectomy	Ileum duplex	3 +	20	
24	M	44		Acute appendicitis	2 +	25	Cat appendix

TABLE 1.—*(Cont'd)—Analysis of 44 Cases*

25	M	23		Appendicitis	3 +	20	None; appendix normal
26	F	45	Right nephrectomy and appendectomy	Possible ileum duplex	1 +	15	
27	M	25		Chronic appendicitis	2 +	20	
28	M	27		Appendicitis	3 +	20	Cat appendix
29	M	34		Obstruction	3 +	25	None; appendix normal
30	F	29		Dysmenorrhea	1 +	20	Appendix fibrous
31	F	34	Hysterectomy; appendectomy	Possible ileum duplex	4 +	20	Chronic cervicitis
32	M	40		Appendicitis	3 +	20	Fibrosis of appendix
33	M	62		Diverticulitis	4 +	15	None; appendix normal
34	M	29		Appendicitis	2 +	10	Cat appendix
35	M	22		Acute appendicitis	2 +	7.5	None; appendix normal
36	M	42	Appendectomy	Obstruction	4 +	20	
37	M	34	Appendectomy	Obstruction		20	
38	M	19		Appendicitis	2 +	10.7	Chronic appendicitis
39	M	23		Appendicitis	2 +	13.5	Acute appendicitis
40	F	21		Tubular gestation	3 +	15	None; appendix normal
41	F	18 mo.		Appendectomy	2 +	10	Mesenteric glandular disease
42	F	34		Ileum duplex	4 +	20	Subacute appendicitis
43	F	36	Cholecystectomy; appendectomy; ovariectomy	Ileum duplex	1 +	10	
44	M	64		Carcinoma of cecum	2 +	15	Cholecystic disease; carcinoma of cecum

to demonstrate the ileum, the cecum and the appendix.

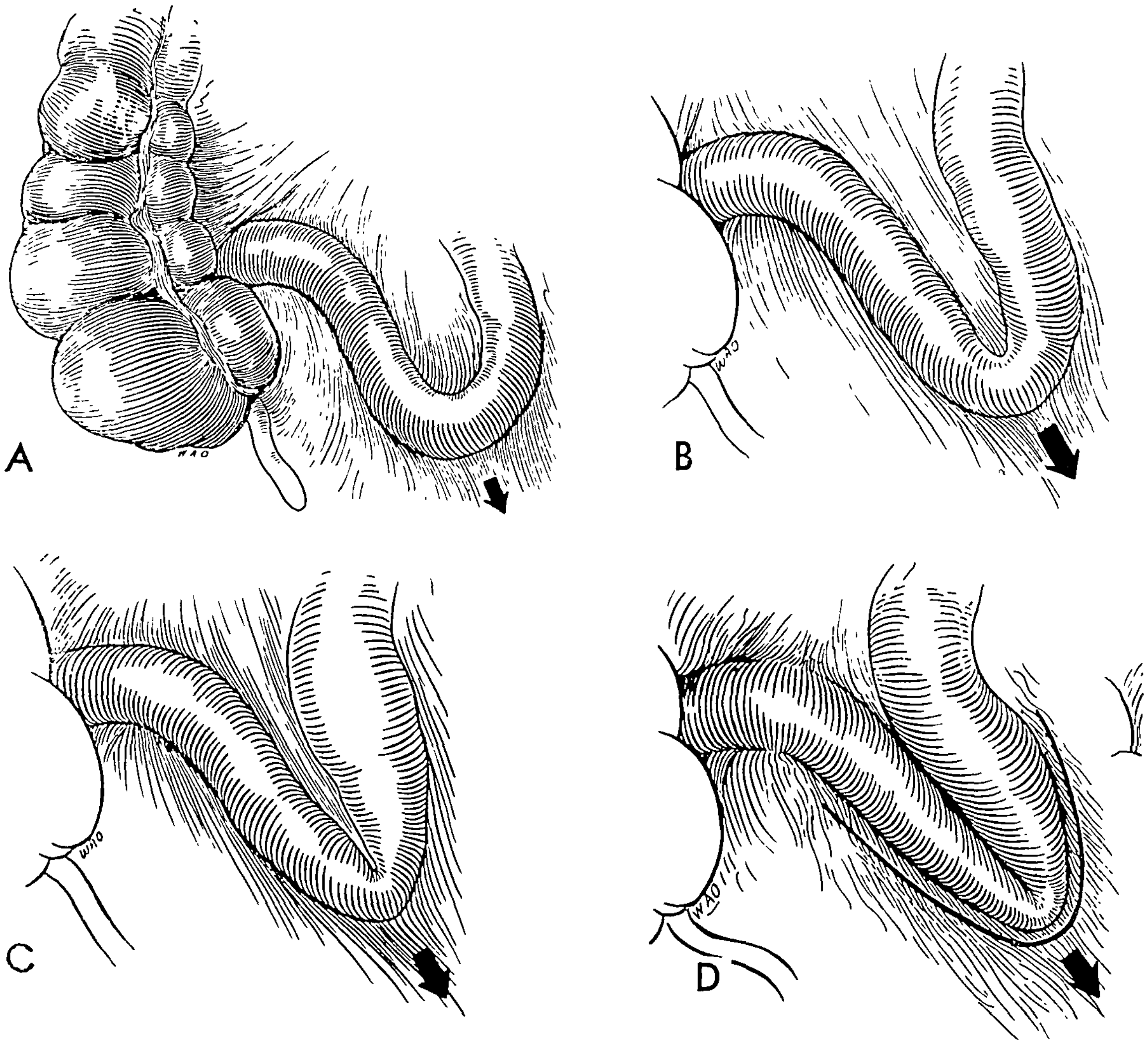
One may visualize the posterior peritoneum as it reflects upward onto the mesentery of the small bowel, and it is apparent that with shortening of the peritoneum a section of the bowel would be drawn downward, forming a U (*A*). In subsequent stages (*B*, *C* and *D*) the duplex becomes V-shaped until eventually it is complete and obstruction is acute.

One year ago, in *Postgraduate Medicine*, I reported 37 cases encountered in the previous five-year period. Since then I have added 7 cases.

Symptoms.—A history of eructations of gas, heartburn, waterbrash, pain chiefly referred to the lower right abdominal quadrant and accompanied by nausea and vomiting, minor at first but gradually increasing in severity, is usually elicited.

In approximately 28 per cent of cases the appendix has been removed previously.

The aforedescribed pain is apparently



Terminal ileum duplex. With shortening of the peritoneum a section of bowel is drawn forward (*A*), forming a U-shaped curve. In subsequent stages the duplex changes from a U to a V as in drawings *B, C* and *D.*

not related to meals, but when closely interrogated the patients state that this symptom is cramplike, coming on gradually about five or six hours after the ingestion of food or liquid.

The pain reaches maximum severity and then gradually subsides, after which there is freedom from all symptoms for several hours. The temperature and pulse rate are not usually elevated. Urination and bowel habits are seldom altered, and blood is not evident in the stools. Loss of appetite is common, owing to the patient's fear of pain after taking food.

Diagnosis.—When normal peristalsis is passing the food bolus along the small bowel an interruption occurs at the point of partial or complete obstruction, producing a delay in the peristalic movement and resulting in pain or distress.

This phenomenon of delayed peristalsis as the wave advances toward the apex of the double ileum may be observed directly by the surgeon.

In diagnosing ileum duplex the case history is important, with careful consideration of the periodicity of distress throughout the twenty-four hour period.

TABLE 2.—*Grade Distribution of Terminal Ileum Duplex in 44 Cases*

Grade	No. of Cases
+1	11
+2	9
+3	17
+4	7

TABLE 3.—*Symptoms and Signs in 44 Cases*

Nausea	38
Vomiting	33
Increased W.B.C.	20
Elevated temperature	23
Accelerated pulse rate	27
Weight loss	10

Normally, ingested food reaches the terminal portion of the ileum approximately six to eight hours after entering the stomach, provided no obstruction is encountered in the intestine. It is easy to visualize peristalsis in the small bowel moving the food residue along to the point of semi-obstruction—the apex of the duplex—where it is blocked. The resulting pain persists until the contents of the bowel have been forced past the area of obstruction, after which a period of relief ensues.

If the roentgenologist is forewarned he may be of tremendous assistance in establishing a preoperative diagnosis of ileum duplex. Careful roentgen examination, with close observation of the progress of the barium meal, may reveal a retardation in its passage through the small bowel and verify the suspected delay in emptying of the terminal part of the ileum.

Abdominal distress may be absent during periods of the day when the terminal portion of the bowel is empty. Palpation of the abdomen during this quiescent time will usually reveal no abnormality, but when the ileum is full there will be tenderness in the right lower quadrant, severe even to the point of splinting. Rectal examination as a rule gives negative results.

Ileum duplex must be differentiated from acute appendicitis, mesenteric adenitis, acute obstruction and Meckel's diverticulum.

Of these, undoubtedly the most commonly mistaken diagnosis is that of acute or chronic appendicitis. In patients who have undergone previous appendectomy without relief of symptoms, a careful history and physical examination, accompanied by roentgen studies and consideration of the normal temperature, the normal pulse rate and the normal leukocyte count, may provide the basis for a diagnosis of ileum duplex.

This abnormality occurs in patients of both sexes at all stages in life, but seems to occur more frequently in the third and fourth decades. Among the cases presented in Table 1 were 3 members of the same family, all between 15 and 25 years old. One had previously been appendectomized; in the cases of the other 2, the provisional diagnoses were "acute appendicitis" but at operation normal appendixes were observed. In each of the 3 patients a duplex (plus 3) was subsequently corrected, with complete relief.

Surgical Procedure. — Preoperative Care: Complete physical examination and any necessary dental care usually advocated before an elective surgical procedure should be recommended. Complete laboratory examinations of the blood and urine should be ordered on the patient's admission to the hospital. A high calory, high protein, liquid diet should be given. Laxatives of choice are given until the entire bowel is free of fecal contents.

Abdominal preparation of choice is prescribed for the day of operation. Preop-

TABLE 4.—*Number of Patients Previously Operated On*

Appendectomy	12
Other operations	9

TABLE 5.—*Age and Sex Incidence*

Female	22	
Male	22	
Average age		34.15 years

erative sedation is ordered according to the anesthetist's instructions. Preferably, the operation is performed with spinal anesthesia, which produces a quiescent abdomen for exploratory purposes, eliminating unnecessary packing or manipulation of the bowel.

Technic.—In exploring the abdomen the surgeon may find an appendix that appears normal. Careful inspection of the terminal portion of the ileum may reveal partial or complete kinking of the small bowel and shortening of the posterior peritoneum, pulling down on the mesentery of the ileum. When this tension is released and the bowel brought upward and forward an area is left denuded.

To provide a covering for this it is usually necessary to strip the peritoneum laterally and inwardly so that a plastic repair may be accomplished over this unprotected area. Without good visualization, the small vessels of the mesentery may be inadvertently destroyed.

Postoperative care may be routine hospital procedure, with fluids and diet as tolerated by the patient. Sedation should be minimal, to avoid any interference with the peristalic movements of the intestine.

SUMMARY

An abnormality of the terminal portion of the ileum is described, differing from Lane's kink or "intestinal stasis" of the ileum. It occurs in men and women of all ages but most frequently in patients between 20 and 40 years of age. The author's youngest patient was 18 months old and the oldest 64 years of age.

The condition is characterized by pain produced by interference with the peristalic action of the ileum.

Terminal ileum duplex may be diagnosed preoperatively. Surgical repair definitely will relieve the abdominal symptoms produced by this condition.

ZUSAMMENFASSUNG

Es wird eine Anomalie des Endabschnittes des Ileums beschrieben, die sich von der Laneschen Knickung oder der "intestinalen Stasis" des Ileums unterscheidet. Die Anomalie tritt bei Männern und Frauen jeden Alters auf, meist aber bei Kranken zwischen zwanzig und vierzig Jahren. Der jüngste Kranke in der Beobachtung des Verfassers war 18 Monate alt, der älteste 64 Jahre.

Die Erkrankung ist gekennzeichnet durch Schmerzen, die durch eine Störung der Peristaltik des Ileums entstehen.

Die Doppelung des Endabschnittes des Ileums kann vor der Operation diagnostiziert werden. Die chirurgische Korrektur beseitigt unfehlbar die durch die Erkrankung hervorgerufenen Bauchsymptome.

RÉSUMÉ

L'auteur décrit une anomalie de la portion terminale del'iléum différent de la coudure de LAN, ou stase intestinale de l'iléum.

Tous les âges et tous les sexes en sont affligés surtout entre 20 et 40 ans. Le plus jeune des cas de l'auteur avait 18 mois; le plus âgé, 64 ans. Cette morbidité est caractérisée par de la douleur secondaire au péristaltisme de l'intestin. Le diagnostic peut se faire préopératoire. Le tratement est chirurgical.

RIASSUNTO

Viene descritta un'anomalia della porzione terminale dell'ileo, che differisce dalla "stasi intestinale" dell'ileo. Essa si verifica in uomini e donne di tutte le età ma il più spesso in pazienti fra i 20 ed i 40 anni. Il più giovane paziente visitato dall'Autore aveva 18 mesi, mentre il più vecchio aveva 64 anni.

Tale affezione è caratterizzata da dolore forte, provocato dalla interferenza alla peristalsi dell'iseo.

L'ileo terminale doppio può essere diagnosticato pre-operatoriamente. L'intervento chirurgico guarisce definitivamente i sintomi addominali prodotti da questa affezione.

RESUMEN

Se describe una anormalidad de la porción terminal del ileum, diferente de acodamiento de Lan ó “estasis intestinal” del iluem. Se presenta en el hombre y la mujer de todas las edades, pero es más frecuente entre los 20 y los 40 años de edad. El paciente más joven del autor fué de 18 meses de edad y el más viejo de 64 años de edad.

El padecimiento se caracteriza por dolor producido po rla interferencia de los movimientos peristálticos del ileum.

El ileum terminal doble puede ser diagnosticado preoperatoriamente. La corrección quirúrgica aliviará definitivamente los síntomas abdominales producidos por este padecimiento.

RESUMO

Descreve o autôr uma anormalidade no ileo terminal, diversa daquelas até então registradas e estudadas. Pode ocorrer no homen ou na mulher, em qualquer idade, porém mais frequentemente em pacientes situados entre os 20 e 40 anos da idade, sendo que na estatistica do autôr o doente mais jovem tinha 18 mêses e o mais idoso 64 anos.

A condição patologica descrita se caracterisa pelo sintôma dôr, provocada pela interferencia sôbre a ação peristalitica do ileo.

O diagnostico deve sêr pre-operatório, e o tratamento cirúrgico radical virá fazer desaparecer todos os sintômas produzidos por tal anormalidade.

Diabetes—A Historical Note

Just how long this disease has been prevalent we do not know, but it seems to have been known to the writer of the earliest medical document we possess, the papyrus, Ebers, which dates from approximately 1500 B.C. This venerable Egyptian document, now preserved in the University Library at Leipzig, was written about the time that Abraham left Haran to found the Jewish nation, three centuries before the birth of Moses, five hundred years before the birth of Homer, and one thousand years before the births of Hippocrates, Confucius, and Buddha . . . From this early age, throughout the following centuries, we find only occasional references to this affliction. Galen, one of the greatest physicians of antiquity, who practiced in Rome during the first century of the Christian era, was familiar with the disease, but said it was exceedingly rare and that he had seen but two cases in all of his extensive practice.

Ralph H. Major, M.D.

Traumatic Neck, Head, Eye Syndrome

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HEAD injuries accompanied by injuries to the upper part of the vertebral column present a problem in symptomatic differentiation. It is often necessary to ascertain whether the symptoms in the head are due to brain damage or whether they are due to damage in the neck and the upper part of the thoracic area, causing neural symptoms radiating to the head.

In attempting to shed light on this subject I have analyzed a series of cases at the Billig Clinic in which serious damage to the neck and upper part of the thorax was incurred but in which there was no direct trauma to the head. Trauma in this series of cases was the result of the whiplash type of damage resulting from automobile accidents, in which usually the patient was seated in a car and the neck was violently jerked to and fro when the car was struck from the rear by another vehicle.

Careful analysis of the picture presented by the patients in these cases, in which any symptoms and signs referable to the head, would be the reflection of sensation from radiating nerve pathways from the cervical and upper dorsal region, reveals the following injuries:

1. Narrowing of one or more of the cervical dorsal intervertebral discs, by compression, as revealed by roentgenographic studies. These injuries in themselves usually did not cause immediate pain, but as time went on the development of traumatic arthritic changes, due to altered mechanical stresses, was observed. Associated abnormalities were loss or reversal of the cervical curve and a rare herniation of the intervertebral discs.

2. Chip fractures, or compression damage of the lips of the vertebral bodies, which were sometimes displaced but more frequently *in situ.*

3. Occasional compression fracture of the body of one or more vertebrae. No cases of complicating fracture of the lamina or of complete dislocation were selected for this series.

4. Tear of the facet joint ligaments. This occurred in a small percentage of the cases and could be determined by resultant anterior or posterior subluxation demonstrated by forward or backward shift of the relative positions of the vertebral bodies in roentgenographically determined alignment. In these cases the subluxation usually did not materialize until six months or more after the date of trauma, so that it is well to remember that all injuries to the neck should be followed by periodic roentgenographic studies for several years after the following injury, with this point in mind.

5. Pressure sensory hypersensitivity over the cervical dorsal area. This sensitivity extends to include the skin of the area and is similar to the type described by S. Weir Mitchell in his writings on causalgia.

6. Immediate pain and muscular involuntary spasm restriction of motion in the neck and the upper part of the dorsal region. This is followed by a "strain contracture" developing in the fascial ligamentous structures during the ensuing weeks and persisting as a fixed restriction of motion until it is released by progressive accumulative gentle mobilization stretching. This mobilization stretching usually takes several months to accomplish and is something like climbing up three stairs

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and sliding back two. At the Billig Clinic the most satisfactory means of accomplishing it has been found to be forced active rotation of head, neck and thorax to each side by the patient at routine intervals for three periods daily. Aid is given by a therapist who makes three visits weekly, so as to insure progression, continuity and accuracy. In all cases, both in testing and in therapy, when motion is attempted past the point of restriction, the symptoms complained of, including those radiating to the head and arm, are exacerbated, so that it is possible to guide the stretching by elicitation of symptoms and make sure that the proper directions for loosening are carried out.

7. Electromyographic evidence of motor nerve. This was found by testing the muscles supplied by the cervical dorsal motor nerve fibers. In testing by forced motion as described under Point 6, evidence of compression stimulus of the motor nerve fibers by the fascial ligamentous contracture could be demonstrated with the electromyograph by means of the increased motor unit activity with each increased forced rotation of the neck and the upper thoracic portion of the spine. This was quite dramatic and has been repeated over and over again for diagnostic, demonstration and teaching purposes.

8. Sensory pain referable to the spinal peripheral nerves. This was complained of as radiating to the head in the distribution of the great occipital, small occipital, cervical cutaneous or other ramifications of the cervical plexus (the patients frequently pointed to the temple as the location of painful "headache"). A few complained of hypersensitivity of the scalp in the region of distribution of these nerves. An occasional patient complained of facial neuralgia, up to and including the severity of tic douloureux. These patients tended to a chronic causalgia-like facial neuralgia persisting for years after the trauma; they were included in this series to demonstrate one of the symptoms that tend to persist. Treatment, with relief of this symptom, followed the same pattern as described under Point 6.

9. Pain referable to the spinal peripheral nerves with complaint of radiation out to the arm and the upper intercostal areas in the distribution of the cervical dorsal sensory nerve fibers. This was frequently observed. Radiating into the arm most frequently took the pattern of distribution of the ulnar nerve.

10. Disturbance of cervical postural reflexes. Symptoms of this kind of injury could be determined by a history of discordination immediately following the trauma. In testing, this could also be demonstrated by means of the forced cervical dorsal rotation.

11. "Blurred vision" unrelated to ocular visual defects. This was complained of in nearly all of the cases. In those of severe involvement the blurred vision was persistent, and those in which the involvement was milder it was described as transitory. Some of the patients described this symptom differently; e.g., "Objects seem to recede from them" or "I seem to lose my focus." Observation of the eye during a test of the cervicodorsal extent of rotatory mobility revealed wide unilateral mydriasis regularly occurring with each forced rotation and maintaining itself until the forced rotatory pressure was released. In many of these patients active voluntary rotation of the neck to the restrictive ligamentous limit elicited the wide unilateral mydriasis without the necessity of passive aid. It is noteworthy that at the time of the forced rotatory motion of the neck and the upper part of the back there was also, as stated under Point 6, an exacerbation of the sensory pain distributed along the nerve pattern of the spinal cervical plexus. An even more noteworthy observation is that at the time of mydriasis there was produced on the ipsilateral side of the face a vascular constriction and hidrosis, the cold, clammy beads of sweat breaking out within a few minutes and persisting for fifteen or twenty minutes or more. It was concluded that this combination of signs represents a form of hyperstimulation of the cervical sympathetic division, coming

from the first, second and third thoracic nerves and traversing the cervical ganglia to become distributed to the head and eye from the superior cervical ganglia. In fact, the signs and symptoms elicited are exactly opposite to those present when the cervical sympathetic division has been interrupted (Horner's syndrome).

The careful study of causalgia dating back to S. Weir Mitchell's descriptions and including analysis of the functional balance of the autonomic nervous system as first brought to attention by J. E. Langley, has led many investigators into the field of autonomic nerve surgery as well as drug control therapy. In many ways the aforedescribed symptoms and signs in the head and eyes following cervical dorsal injuries resemble those of causalgia, and it has been suspected that causalgia is connected with overfunction of the sympathetic nerves.

On the basis of this line of reasoning, a carefully planned remobilization of the neck and the upper part of the back by means of progressive stretching exercises has been carried out in order to free the nerves from their constriction stimuli in their foraminal pathways through the contracted fascial ligamentous structure. It has been attended with gratifying elimination of symptoms and signs. It has been noted that, once full rotatory range of motion in the neck and the upper dorsal portion of the spine has been obtained, the patients become symptom-free. However, it has also been noted that if they do not continue sufficient mobilization stretching exercises to maintain the full range of motion they are subject to recurrence. A number of patients who, when they became symptom-free, disobeyed instructions and stopped the exercises completely, have had to return for a repeat series of progressive gentle accumulative mobilization stretchings in order to regain the normal range of motion.

SUMMARY

1. The various signs and symptoms in the head and eye resulting from injury to the cervical dorsal area are listed.

2. Cephalic and ocular symptoms and signs consistent with overstimulation of the cervical sympathetic division following traumatic whiplash injuries to the cervical dorsal area are described.

3. It is suggested that the cause of persistence of signs and symptoms is abnormal compression simulation of the foraminal nerve due to strain contracture of the fascial ligamentous structures following trauma.

4. A method of obtaining relief of symptoms and signs by release of foraminal nerve compression, involving progressive accumulative stretching-loosening mobilization of the fascial ligaments, is presented.

5. The importance of differentiation of such symptoms from those due to brain injury is emphasized.

RESUMEN

1. Se enumeran los signos y síntomas de la cabeza y ojo resultantes de la lesión en el área cervico dorsal.

2. Se describen los síntomas cefálicos y oculares con estimulación del simpático cervical, siguientes a lesiones traumáticas del área cervicodorsal.

3. Se sugiere que la causa de persistencia de síntomas y signos es la compresión anormal que estimula el nervio del foramen debido a la contractura de las estructuras ligamentosas fasciales después del traumatismo.

4. Se presenta un método para aliviar los síntomas y signos liberando la compresión del nervio por medio de la mobilización progresiva estiramiento-aflojamiento de las estructuras ligamentosas fasciales.

5. Se hace notar la importancia de la diferenciación de tales síntomas de los debidos a lesión cerebral.

ZUSAMMENFASSUNG

1. Es werden die verschiedenen Befunde und Symptome am Kopf und Auge aufgezählt, die als Folge von Verletzung der

Hals-Rückengegend entstehen.

2. Es werden Kopf- und Augensymptome beschrieben, die im Anschluss an peitschenschlagähnliche Verletzungen der Hals-Rückengegend auftreten und der Ausdruck einer Ueberreizung des Halsabschnittes des Sympathikus sind.

3. Als Ursache für das Anhalten der Befunde und Beschwerden wird eine unnormale Druckreizung des Nerven im Foramen angesehen, die durch eine Stauchungskontraktur der Faszien und Bänder im Anschluss an die Verletzung zustande kommt.

4. Es wird ein Verfahren beschrieben, die Symptome und Krankheitszeichen durch Entlastung des Nerven vom Druck zu beseitigen, was durcch allmähliche gesteigerte Streckungs- und Entspannungsbewegungen der Faszien und Bänder geschieht.

5. Es wird hervorgehoben, wie wichtig es ist, die hier erörterten Symptome von den durch Hirnverletzungen bedingten Krankheitszeichen zu unterscheiden.

RESUMO

1. São enumerados os sinais e sintômas evidenciados sôbre a visão e a cabeça, resultantes de traumatismos sôbre a região dorvico-dorsal.

2. Descreve o autôr os sintômas e sinais oculares e cefalicos com exacerbação do simpático cervical, consequentes a feridas traumaticas da região cervico-dorsal.

3. Sugere que a causa da persistencia de tais sintômas e sinais sêja uma compressão anormal exagerada de elementos nervosos.

4. E apresentado um processo para obter melhoria de tais complicações, o qual tem por base uma mobilisação dos ligamentos faciais.

RÉSUMÉ

L'auteur décrit la symptomatologie des lésions de la région dorso-cervicale en relation evac l'oeil et la tête. Des signes persistent à l'oeil et à la tête par stimulus exagéré du sympathique cervical. Ces signes sont secondaires à une compression anormale avec une stimulation des nerfs faciaux. On peut obtenir un relâchement de cette tension faciale secondaire à la compression par un procédé que l'auteur décrit. Il est important de faire un diagnostic différentiel d'avec les traumatismes cérébraux.

RIASSUNTO

1. Vengono elencati i vari segni cefalici ed oculari risultanti dopo traumi della regione cervico-dorsale.

2. Vengono descritti i vari segni cefalici ed oculari in rapporto ad una irritazione del simpatico consecutiva a traumi della regione cervico-dorsale.

3. Viene affacciata l'ipotesi che la persistenza dei segni oculari e cefalici è legata ad un abnorme azione irritativa sulle radici nervose, dovuta ad una violenta contrazione dei ligamenti consecutiva al trauma.

4. Viene descritto un metodo tarapeutico dei segni oculari e cefalici avente lo scopo di far cessare la compressione sulle radici nervose a mezzo di una progressiva ginnastica dei ligamenti.

5. Viene sottolineata la necessità di differenziare tali segni da quelli derivanti da un trauma del cervello.

Osteochondroma of the Tendon Sheath

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THE tendon sheath is a connective tissue envelope consisting of an outer fibrous layer and an inner synovial layer resembling closely the lining of joint cavities and bursae. Except for ganglia, neoplasms originating in tendon sheaths are not common, but both benign and malignant forms have been described. King has emphasized the essential unity of all these tumors, inherent in their origin, and has grouped them all as tenosynoviomas. He has also emphasized the presence of synovial spaces in the tumor tissue as an important and characteristic feature. The benign varieties include ganglion, the giant-cell tumor or xanthoma, fibroma, chondroma and osteochondroma. The malignant form is the malignant synovioma or synovial sarcoma. Experience over a six-year period in the pathology department at Presbyterian Hospital includes the following tumors of the tendon sheath: 87 ganglions, 26 benign synoviomas of the giant-cell type, 1 fibroma showing areas of osteoid and cartilaginous tissue, 1 osteochondroma and 1 synovioma of questionable malignancy (three years without recurrence after wide local excision).

Chondroma and osteochondroma, the particular subjects of this report, are rare, and most of those reported have been small. A history of injury has been noted in some cases, and repeated minor traumas incident to walking or to the use of the hand may be a determining factor in the location of many of these tumors in the foot or in the hand.

The pathogenesis of chondroma and osteochondroma of the tendon sheath, springing from tissue that contains neither cartilage nor bone, is a point of interest. Morton has pointed out the close biologic relation between tumors of the tendon sheath and tumors of the joints and bursae and has likened chondroma and osteochondroma of the tendon sheath to chondromatosis of the joints and bursae. The latter condition has been defined by Luck as consisting of "multiple benign osteocartilaginous tumors having their origin in the synovial membrane and subsynovia." Except for reactive changes, the articular cartilage and the articular cortex are not involved. Sir Benjamin Brodie, writing more than a hundred years ago, considered this a neoplasm, and it has been generally so considered since. Hugh Jones, writing on "synovial osteochondromatosis," seems to have expressed essential agreement with Morton in considering the condition a single entity, whether it occurs in a tendon sheath, a joint cavity or a bursa, and reports cases of its occurrence in each. He too considered it neoplastic. Some men have postulated the presence of cell rests to explain the development of cartilage from the synovial membrane. In the opinion of Morton the cells of synovial membrane possess potentialities for the production of cartilage through metaplasia. He presented an interesting case as showing the transition of synovial cells to cartilage, a chondroma of the tendon sheath in the making. This seems to be the sounder view.

Geschickter and Copeland wrote that "both benign osteochondroma and chondrosarcoma may arise within the tendon sheaths independently of bone, just above the point of osseous insertion, where pre-

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cartilaginous tissue normally persists." However, cases have been reported in which the tumor arose far from the point of insertion, and that is true of the case reported here. This case is remarkable for the slow growth of the tumor over a period of thirty years, for the large size of the growth and for its unique appearance; it consisted of hundreds of glistening little cartilaginous nodules, massed together. There was a definite history of injury.

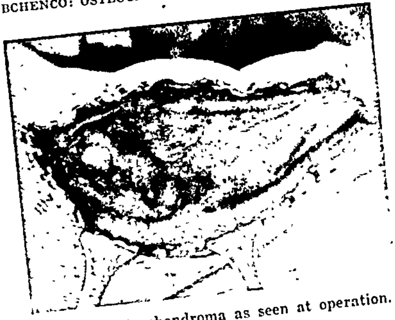

Fig. 1.—Osteochondroma as seen at operation.

REPORT OF A CASE

H. B. F., a white man, was 55 years of age when first seen by us in 1947. He had always led an active, outdoor life and was well developed but lean. He complained of hard knots that had formed on the outer aspect of the left ankle, associated with some pain and stiffness. He stated that he had injured the ankle twenty-five years earlier, when a horse that he was riding stumbled and fell and his left foot and ankle were caught beneath the horse. There was no fracture at the time. The injured ankle quickly improved, and the patient had no disability, but at that time he first noticed the hard knots of which he complained soon afterward. In 1943 he fractured his left leg 7 inches (17.5 cm.) below the knee joint and wore a plaster cast for two months. It was soon after this cast was removed that he first noticed stiffness and discomfort in the region of the ankle. Physical examination on Jan. 2, 1947, showed two groups of massed hard nodules along tendons of the left peroneal muscles back of the lateral malleolus and below it. The nodules were distributed over a length of 5 inches (12.5 cm.). The most prominent part of the lateral surface of the ankle was not the lateral malleolus but a mass of nodules inferior to it. The skin was very thin and showed evidence of pressure over this prominent mass. Only at this point was there lack of motion between the skin and the tumor mass. There was slight limitation of motion of the left ankle joint as compared with the right. Operation was advised at this time but was deferred by the patient.

It was six years later (Jan. 16, 1953) when the patient was examined again. Growth of the tumor mass had been very slow, the length of the tendon now involved being but 5½ inches (13.7 cm.) as compared to 5 inches (12.5 cm.) on the first examination. But the mass was more prominent, and it was becoming increasingly difficult for the patient to put on his shoe and to walk once the shoe was on. The mass was so hard that it was judged to be calcareous, but this was disproved by roentgen examination, which showed no bone or calcification except for a solitary 5 mm. calcification lying posterior to the distal fibular shaft.

The patient was admitted to the Presbyterian Hospital in Denver, and operation was done on February 6. The mass was inseparable from the common sheath surrounding the tendons of the peroneous longus and peroneus brevis muscles. It did not invade and was readily separated from the tendons. It was not attached to the bone. It was readily separated from surrounding tissues everywhere except where it was adherent to skin at the pressure point noted clinically. It was dissected free and removed. The report of the pathologist was as follows:

"The specimen consists of a 72 Gm., 14 by 2.5 to 4 by 2.5 cm. piece of irregularly shaped, hard, at times bony, yellowish to grayish white piece of tissue which, upon sectioning, cuts with marked resistance, with a gritty noise. It presents a shiny white cut surface, showing lobular markings. Submitted separately are several hard shiny white irregularly shaped nodules, measuring 1 cm., which present a shiny, translucent white cut surface. Microscopic study reveals cartilaginous tissue showing, in some areas, calcification with osteoid type of tissue formation. Malignant change is not observed. *Diagnosis*: Osteochondroma of the tendon sheath, left ankle."

The patient made an uneventful recovery

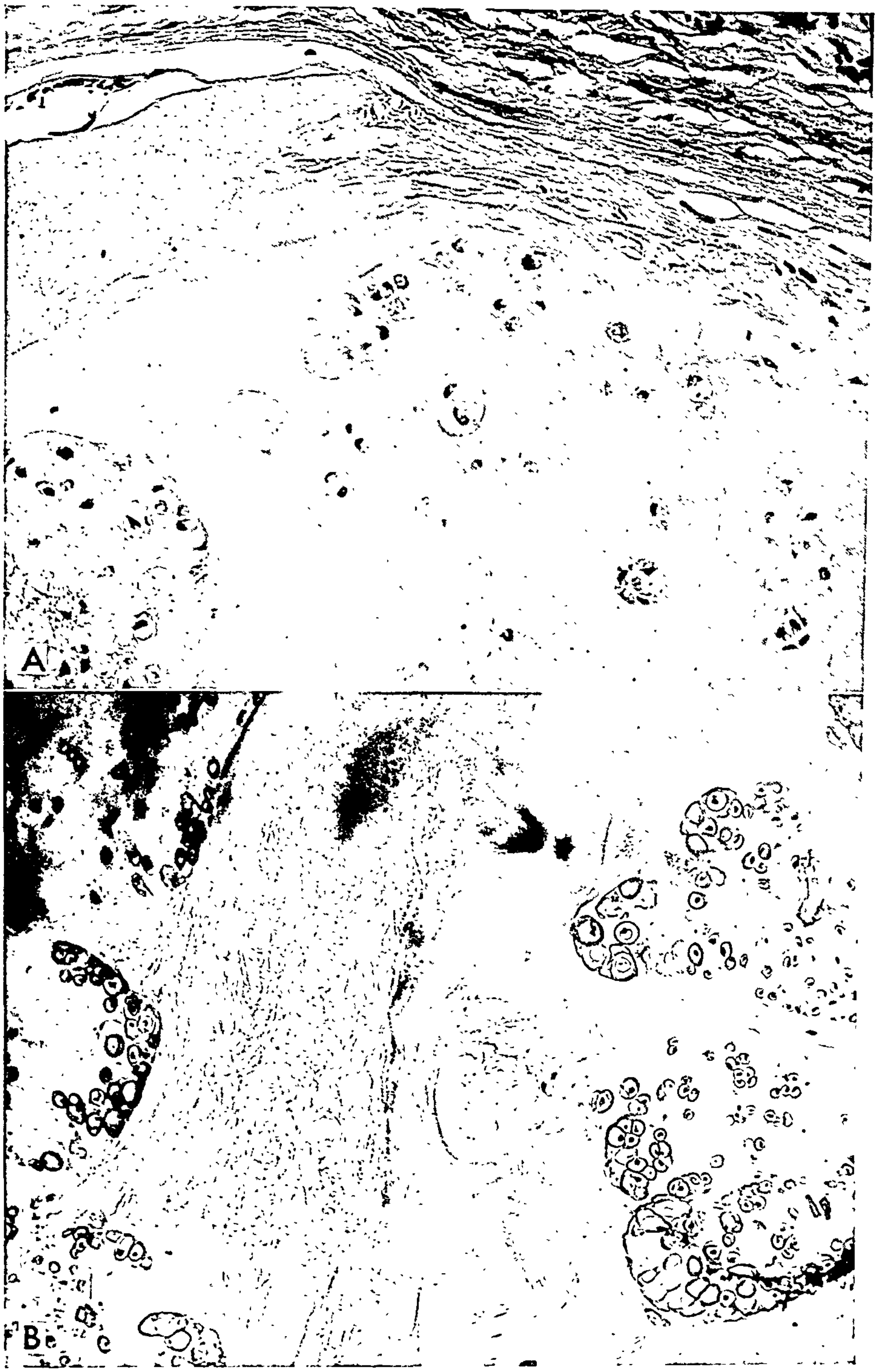

Fig. 2.—*A*, section revealing predominance of cartilage (hematoxylin and eosin). *B*, section revealing osteoid tissue and cartilage (hematoxylin and eosin).

and was normal on examination four months after operation.

SUMMARY

1. The tendon sheath is a tissue of many potentialities, giving rise to a wide variety of connective tissue tumors, all of which may be classified as tenosynoviomas.

2. An unusual case of benign tenosynovioma, (variety, osteochondroma) is reported.

ZUSAMMENFASSUNG

1. Die Sehnenscheide stellt ein Gewebe dar, das viele Möglichkeiten der Transformierung in sich trägt und den Boden für eine Reihe recht verschiedenartiger Bindegewebsgeschwülste, die alle in die Gruppe der Tendosynoviome eingereiht werden können, bildet.

2. Es wird ein ungewöhnlicher Fall eines gutartigen Tendosynovioms (von der Abart des Osteochondroms) berichtet.

RÉSUMÉ

La gaine tendineuse est la source d'une grande variété de tumeurs dites ténosynoviomes. L'auteur en rapporte un cas bénin.

RESUMO

1. As bainhas tendinosas constituem um tecido de grande potencialidade, servindo, por isso mesmo, de séde para o desenvolvimento de consideravel variedade de tumôres conjuntivos, os quais porem sêr classificados, em geral, como tenosinoviômas.

2. E registrade um caso raro de tenosinoviôma benigno (osteocondrôma).

RIASSUNTO

1. Le guaine tendinee possono dar luogo ad una grande varietà di tumori connettivali, che vanno classificati col termine di tenosinoviomi.

2. Viene descritto un raro caso di tenosinovioma benigno. (varietà osteocondroma)

RESUMEN

1. La vaina tendinosa es un tejido multipotencial dando lugar a una gran variedad de tumores de tejido conectivo, que pueden ser clasificados en su totalidad como tendosinoviomas.

2. Se comunica un caso raro de tendosinovioma benigno (variedad osteocondroma).

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Conservative Treatment of Tumors of the Bladder

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WHEN one speaks of conservative treatment of any disease, one instinctively refers to a form of therapy which, in terms of other recognized methods of treatment, is attended by an appreciably lower mortality and morbidity rate. Transurethral treatment of vesical tumors seems to fulfill both of these stipulations.

In this paper I shall confine my comments exclusively to the use of transurethral resection, with or without radon seed implantation, in the treatment or cure of tumors of the bladder.

Bladder tumors can be roughly classified into three categories, according to their potential curability when first seen:

1. Tumors of a fairly low degree of malignancy that involve only the mucosa or the submucosa; i. e., tumors of Stages O and A as classified by Marshall[1] and Jewett.[2] Patients in this group either have extremely benign tumors or have presented themselves for diagnosis and treatment early in the course of the disease.

2. Tumors of a relatively high degree of malignancy, or neglected tumors that involve the muscle of the bladder wall to varying degrees but do not penetrate the muscle layer completely. These fall into the B_1 and B_2 classification of Marshall and Jewett. The clinical history frequently reveals neglect; in other cases the growths were extremely malignant in the first place and are rapidly progressing.

3. Tumors of the C and D stages, with actual invasion of the perivesical fat with or without extensions or lymph node metastases.

Tumors of the first category, namely, those of Stages O and A, can be adequately treated by transurethral resection alone. Those of Stages B_1 and B_2 can usually be adequately treated by transurethral resection, with or without the additional use of cystoscopic radon seed implantation. Tumors of Stages C and D are best treated by ultraradical operation although a few Stage C tumors may be cured by radon seed implantation and palliation may sometimes be accomplished even in this serious stage.

In brief analysis of the causes of failure in a given number of cases of bladder tumor, I should place first the failure of the patient to come for diagnosis and treatment at the first stage of the disease. I reviewed 245 cases in 1943[3] and found that even though hematuria was the presenting symptom in over 94 per cent of the cases, period that elapsed before the patient finally appeared for diagnosis and treatment was twelve months and fifteen days. I am sorry to say this was not *always* the patient's fault.

Second on the list is inadequate treatment. In some instances this results from errors in judgment, but more frequently it is because the patient's physical condition makes anything but conservative surgical intervention out of the question.

Third and last is lack of proper follow-up. I am sincerely convinced that the more thoroughly a patient understands the seriousness of his disease, the more regularly he will return for follow-up examinations. This conviction is well borne out in the report of cases to follow.

The solution of these three problems is to be found in better education of both

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TABLE 1.—*Seventy-Two Cases of Papilloma of the Bladder Treated by Transurethral Resection*

Years	Alive		Dead		Not Followed	
	Without Tumor	With Tumor	Without Tumor	With Tumor	Without Tumor	With Tumor
1			6		15	1
2			4		7	
3			1		2	
4			2		1	
5	6		3		3	
6	5		1		1	
7	5		3			
8	2					
9	2					
10	1					
11						
12	1					
	22		20		29	1

Depth of Extension Classification
O—46
A—24
Unclassified—2

the patient and the referring physician. This will somewhat decrease the number of patients in the second group; in other words those who are beyond help. The question of the last group, of course, is directly dependent upon the constant diligence of the operating surgeon.

The technic of transurethral resection of bladder tumors is really not difficult. An attempt is made to resect all of the tumor, with a margin of at least .05 to 1 cm. of normal bladder mucosa and submucosa, depending upon the apparent clinical degree of malignancy and extension.

Tumor tissue is readily recognized as a homogenous granuloid tissue. The bladder muscle is smooth and readily recognized in its typical bundle form.

In all tumors that do not extend beyond the muscle layer the appearance of the tissue is usually a guide to the accuracy of the resection.

Preoperative bimanual examination is of inestimable value in determining the possible depth of resection required.

Postoperative bimanual examination will reveal to a large extent the degree to which a palpable tumor has been removed and usually is of great prognostic significance.

After resection of the tumor, the base is lightly fulgurated, with adequate control of all bleeding points. If the tumor extends more deeply than one can safely resect, then 1.5 millicure radon seeds are implanted at 1 cm. intervals in such a way as to irradiate 0.5 to 1 cm. of normal margin, to destroy any small groups of cells that may have invaded the perivascular areas or lymphatics.

When radon is used the catheter is connected to a drainage tube, which is kept 18 inches (45.7 cm.) above the level of the bladder so as to keep the bladder partially filled at all times. This prevents irradiation of the opposite bladder wall and the discomfort so commonly described as following the irradiation treatment of vesical cancer.

Violent contraction of the bladder toward the loop, which sometimes occurs when resection is done on the lateral walls, can be prevented by reducing the current

TABLE 2.—*Seventy-Six Cases of Infiltrating Cancer Treated by Transurethral Resection and Radon*

Years	Alive		Dead		Not Followed	
	Without Tumor	With Tumor	Without Tumor	With Tumor	Without Tumor	With Tumor
1			5	34	4	1
2			2	5	1	1
3			1	4*		
4			1	2		
5		1	1	2		
6	1		1	1		
7				2*		
8	1	1	1			
9						
10	1x	1				
11						
12						
13						
	3	3	12	50	5	2

Depth of Extension Classification
A— 2 C —5
B_1—25 D_1—7
B_2—35 Unclassified—2

x—Multiple recurrence of new tumors
*—Sickle cell cancer thought to be due to radiation
*—Malignant melanoma (secondary)

TABLE 3.—*One Hundred and Forty-One Cases of Infiltrating Cancer Treated by Transurethral Resection Alone*

Years	Alive		Dead		Not Followed	
	Without Tumor	With Tumor	Without Tumor	With Tumor	Without Tumor	With Tumor
1			9	49	18	
2			3	9	8	
3			3	1	1	
4			4	3	4	
5	6		3			
6	4		1			
7	1		3			
8	4°					
9	2°					
10	1°					
11	3°					
12						
13	1					
	22		26	62	31	

Depth of Extension Classification

O — 3 C — 4
A —33 D_1—18
B_1—48 D_2— 1
B_2—34

°—One case having multiple recurrence of new tumors
One case adenocarcinoma
Three cases carcinoma in a diverticulum
Operative mortality —2 cases

and resecting with the bladder as nearly empty as one can permit and still obtain proper visualization.

Tumors on the anterior wall can be readily resected by having an assistant exert proper suprapubic pressure to bring the tumor area well into view.

Great care is employed in selecting the proper specimen for microscopic study. The deepest section, involving bladder muscle, is the one usually selected. This will accurately demonstrate the penetration of tumor into muscle and also give a proper histologic picture to serve as a basis for grading.[4] The piece is transfixed vertically with a common pin so that the pathologist may be able to place it in a paraffin block in such a manner as to permit the cutting of accurate vertical sections showing the deepest portion of the lesion.

Postoperative care is simple. The patient is allowed a regular diet, and fluids are forced. For superficial tumors (Stages O and A) the catheter is removed in twenty-four hours. For deep tumors, the catheter is usually left in for four days. This allows a protective inflammatory reaction to be built up around the resected area where the resected area is deep.

All patients are examined cystoscopically at regular intervals after their discharge from the hospital, and recurrences or new tumors are treated if and when they appear.

STATISTICAL REPORT

This report concerns 296 patients who have all been operated upon five years or longer. Two hundred and twenty-eight of these patients, or 77 per cent, have been accurately followed. Sixty-eight, or 23 per cent, have been lost, but no record of their deaths could be found in the New York State Department of Vital Statistics, so most of them are presumed to be alive.

It was rather interesting to note that the more malignant the disease the better the follow-up. The follow-up for papilomas was only 58.3 per cent, as compared with 86.9 per cent for cancers. For more highly malignant cancers for which radon was employed, the follow-up was 90.7 per cent.

I personally reviewed all the records and attempted to classify each tumor as to depth or extension. Both the operative description and the pathologic report were of great assistance in most cases. Two hundred and ninety-two cases were so classified; 4 were impossible to classify.

The classification used was that suggested by Marshall as a modification of the Jewett classification: Stage O, limitation to mucosa; Stage A, limitation to submucosa; Stage B_1, limitation to superficial muscle; Stage B_2, limitation to deep muscle; Stage C, limitation to fat; Stage D, metastases, D_1, local; D_2, distant.

Seven patients were not operated upon and are not therefore included in this report. When first seen they were either moribund or had tumors too extensive to make operation advisable.

Seven tumors were treated by transurethral resection and high voltage roentgen therapy. One Grade III papillary infiltrating cancer so treated was "negative" at the end of one year and then disappeared.

One patient with lymphosarcoma is alive and well fifteen years after the operation. This patient was treated by transurethral resection, cystotomy, radon and high voltage roentgen therapy.

The other 5 were "hopeless" cases and died within twelve months.

Transurethral resection (Table 1) was used exclusively for all papillomas, with the exception of the odd tumor irradiated by use of the radon catheter, as described by Lewis,[5] by roentgen rays, to prevent the multiple recurrences that can be so obnoxious.

Seventy-two patients were treated in this group. The lesions of 70 were classified as tumors of Stages O and A. Those of 2 were not classified.

Thirty-three of these patients survived five years or longer. Many have had recurrences, treated by resection or, when very small, by simple fulguration.

Twenty patients died of other causes, with *no disease present in the bladder.*

All papillomas of the bladder should be treated transurethrally unless the size of the tumor makes this inadvisable for the individual surgeon. One such tumor in this series, a single papilloma on a stalk 1.5 cm. in diameter, weighed 132 Gm. Many have weighed from 50 to 100 Gm.

Transurethral resection and radon seed implantation (Table 2) was done in 76 cases. In 47 of these cases the tumors were graded B_2 or higher.

Only two tumors were graded A. Two were unclassified.

Fourteen patients, or 18.4 per cent, have *survived five years or more. If one considers* 47 of the 70 patients classified to have had deep tumors as described by Jewett with a five-year survival expectancy of only 3 per cent one could anticipate that only 1.4 per cent from this group would have survived five years. This leaves a total of 12.6 per cent surviving five years from the groups A and B_1, which is nearly a 50 per cent five-year survival.

Twelve of these patients died from other

TABLE 4.—*Conservative Operation: 222 Cancers Graded as to Depth of Extension*

Survival, Years	*A*		*B_1*		*B_2*		*C*		*D_1*		*D_2*	
	O	*X*	*O*	*X*	*O*	*X*	*O*	*X*	*O*	*X*	*O*	*X*
1	9	4	14	17	9	37		8		22		
2	3		5	3	2	6		2		2		
3	2		6	4	1	2				1		
4	3	1	5	3		3				1		
5	3		5	3				1				
6	3		2			1						
7	3		1	2	2							
8	3		2	2	2							
9			1		1							
10			1		1	1						
11	1				1							
12		1										
13												
14	1		1									
15			1		1							
Total Cases	31	5	45	31	20	50	0	11	0	26	0	0

O—Without Tumor
X—With Tumor

causes. Five without demonstrable tumor when last seen could not be followed, but no death record could be found at the Bureau of Vital Statistics. This would indicate that the tumors of 20, or 26.3 per cent of the entire group, had been eradicated as a result of their treatment. Recurrences and new tumors did occur in some cases and were treated as they appeared. There were no operative deaths.

Transurethral resection alone (Table 3) was used in 141 cases of infiltrating cancer. Several resections in this group were performed purely for palliation. Twenty-nine of the patients, or 20.6 per cent, survived five years or more without tumor. Four had multiple recurrences, which were treated as they appeared.

Seventy-nine patients, either living or dead, remained free from tumor. This represents 56 per cent of the entire group. Again, 18 of these were not followed, but no record of their demise could be found in the New York State Bureau of Vital Statistics.

Of course, there was a higher percentage of potentially curable cancers in this group than in those treated by resection and radon. Eighty-four patients of this group fell into the "superficial" classification, the tumor penetrating the bladder wall no farther than one-half of the muscle layer. Of the remaining 57, if one expects a 3 per cent five-year survival, this would equal 1.7 per cent, or roughly 2. This leaves 27 patients with superficial tumors surviving five years or more, a five-year survival rate of 32 per cent.

Two patients died as a result of surgical treatment, an operative mortality rate of 1.4 per cent.

An attempt was made to correlate survival rates with depth of extension (See Table 4).

Disease was apparently eradicated by conservative surgical treatment in 31, or 86 per cent, of patients with Stage A tumors; 45, or approximately 57 per cent, of those with tumors of Stage B_1, and 20, or 28.5 per cent, of those whose tumors were of Stage B_2. Eradication occurred in none of the patients with tumors of Stages C and D.

SUMMARY AND CONCLUSIONS

The cases of 296 patients with tumors of the bladder, all of them operatively treated five years or more prior to the time of writing, are reviewed. A method of accurate histologic study of biopsy specimens is presented.

Survival statistics on operative procedures in this field are analyzed, and a correlation of the stage of tumor, type of treatment and survival rate made. From this study it would seem that (1) conservative surgical measures will result in as good a survival rate, or better, with tumors in Stages O, A, B_1 and B_2, as will more radical procedures; (2) tumors in Stages C, D_1 and D_2 are best treated by radical surgical intervention, with node dissection, and (3) if it were not for the postoperative mortality and morbidity rates accompanying radical operations, some B_2 tumors would probably be better treated by radical removal and node dissection.

The operative mortality rate for the cases reported was 0.6 per cent.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

296 Fälle von Kranken mit Blasengeschwülsten, die sämtlich fünf oder mehr Jahre vor Abfassung der Arbeit operativ behandelt wurden, werden untersucht. Es wird eine Methode zur zuverlässigen histologischen Untersuchung des Probeexzisionsmaterials angegeben.

Die Uberlebensziffern der verschienen chirurgischen Verfahren auf diese Gebie werden statistisch analysiert, und die Beziehungen zwischen dem Stadium der Geschwulst, der Art der Behandlung und der Uberlebensquote werden aufgedeckt. Daraus scheint sich zu ergeben, dass (1) bei Geschwülsten in den Stadien O, A, B_1 und B_2 konservative chirurgische Massnahmen eine ebenso günstige wenn nicht bessere Uberlebensziffer aufweisen als radikalere Verfahren; (2) Geschwülste in den Stadien C, D_1 und D_2 am besten mit radikalen chirurgischen Eingriffen einschliesslich der Resektion von Lymphknoten behandelt werden; und (4) dass auch einige von den Geschwülsten aus der B_2-Gruppe wahrscheinlich besser mit radikaler Entfer-

nung und Lymphknotenresektion behandelt würden, wenn man nicht die hohen postoperativen Sterblichkeits- und Morbiditätsquoten solcher Eingriffe in Betracht zu ziehen hätte.

Die Operationssterblichkeit der hier vorliegenden Krankenserie betrug 0,6 Prozent.

RESUMEN Y CONCLUSIONES

Se revisan los casos de 296 pacientes con tumores de la vejiga, todos ellos tratados quirúrgicamente, cinco años ó más antes del tiempo de escribirse. Se presenta un método de estudio histológico preciso para el especimen biopsia.

Se analizan las estadísticas de supervivencia en procedimientos quirúrgicos en este campo, y se hacen correlaciones del estadío del tumor, tipo de tratamiento y grado de supervivencia. A partir de este estudio puede verse que (1) las medidas quirúrgicas conservadoras resultan en supervivencia tan buena ó mejor a la de procedimientos más radicales en tumors con estadíos O, A, B_1 y B_2; (2) los tumores en estadío C, D_1 y D_2 son tratados mejor por la intervención quirúrgica radical, con disección gannglionar y (3) si no fuera por la mortalidad y morbilidad postoperatoria que acompaña a los operaciones radicales, algunos tumors B_2 probablemente serían tratados mejor por la extirpación radical y las disección ganglionar.

El grado de mortalidad operatoria para los casos comunicados fué 0.6 por ciento.

RÉSUMÈ

L'auteur passe en revue 296 cas de tumeurs de vessie opérés depuis 5 ans et plus. Il fait l'analyse de chaque catégorie après les avoir classées. Il opine qu'un traitement conservateur est recommnadé pour les catégories O, A, B_1—B_2; les catégories C—D_1—D_2 requièrent une chirurgie plus radicale avec résections des ganglions. A cause d'une mortalité et d'un morbidité post-opératoire élevées, la classe B_2 bénéficierait d'une cure plus radicale. La mortalité de l'auteur est de 0.6%.

CONCLUSIONI RIASSUNTIVE

L'A. rivede i casi di 296 pazienti affetti da carcinoma della vescica, operati 5 o più anni prima. Presenta un metodo per l'accurato studio istologico dei frammenti prelevati a scopo bioptico.

Analizza le statistiche sulla sopravvivenza ottenuta in tale campo con la cura chirurgica rapportando tale sopravvivenza al grado di sviluppo del tumore e al tipo d'intervento.

Da questo studio sembrerebbe che: 1) nei tumori allo stadio O, A, B_1 e B_2 gli interventi meno radicali danno sopravvivenze altrettanto buone, o migliori, degli interventi più demolitori; 2) nei tumori allo stadio C, D_1 e D_2 è meglio praticare interventi radicali compredenti l'asportazione dei linfonodi regionali; 3) se non fosse per la mortalità e la morbilità postoperatoria connessa con gli interventi radicali, anche alcuni tumori allo stadio B_2 sarebbero più vantaggiosamente curati con operazioni demolitrici comprendenti l'asportazione d ei linfonodi.

La percentuale di mortalità nei casi riferiti fu del 0,6%.

RESUMO E CONCLUSOES

São revistos os casos de tumôres da bexiga encontrados em 296 doentes tratados operatoriamente, a cinco e mais anos, sendo traçado um metodo para acurado estudo histologico de materiais colhidos em biopsias.

Analiza o autôr as estatisticas de sôbrevida nos doentes operados, fazendo um estudo comparativo sôbre o gráu do tumôr, o tipo do tratamento e a sôbrevida verificada, concluindo:

(1) os metodos cirúrgicos conservadôres oferecem bons resultados operatórios quanto a sôbrevida nos casos de tumôres gráus O, A, B_1 e B_2, sendo em tais ca s melhores ainda que os process

(2) os tumôres do grupo C, D_1 e D_2 são melhormente tratados pelos metodos radicais com disseção nodular;

(3) certos tumôres do grau B_2, provavelmente, obterão melhor resultado com a utilização do processo preconizado no item anterior.

Acentua o autôr que a porcentagem de mortalidade operatória em sua estatistica é de 0,6%.

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THE BULLETIN

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Effect of Surgical Stress on Blood Levels of Calcium and Phosphorus

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IT is well known that certain types of stress produce, among other hematic changes, variations in the values for serum calcium and phosphorus. Pincus (1950) considered the phosphorus level in *blood and urine an indicator of adreno-*cortical activity.[1]

Variations of blood phosphorus have been mentioned in connection with the dextrose tolerance test,[1] the pursuit meter test,[1] the targetball frustration test,[1] fracture,[2] postural stress,[3] defibrinized toxic blood injection,[4] ether anesthesia,[5] orthopedic operations,[6] shock,[7] electroshock,[8] hemorrhage,[9] muscular trauma[9b] and other traumatisms.[10] Variations in serum calcium have also been reported as associated with emotion,[11] electroshock,[12] hemorrhage[9b] and other traumatisms.[13]

We have no information that the variations in blood calcium and phosphorus due to surgical stress have been studied. We have made this investigation to study the effect of surgical stress on calcium and phosphorus in man.

Tisdall and Harris[14] observed in 1922 an increase of blood phosphorus. This was confirmed by Eddy and Heft (1923),[15] who also observed this increase associated with the cicatrization of nonosseous tissues and in surgical operations. Cuthberson (1930)[13a] confirmed the observation in 4 cases. After this primary investigation, Duncan (1943)[10e] described an increase of phosphorus due to muscular trauma. The same observations were recorded by Neufeld, Toby and Noble (1943),[10b] Mylon, Witernitz and Suto-Nagy (1943),[10c] Green (1943),[10d] Bellman and Flock (1944),[10f] *Allison, Cole, Holmes and Root* (1947),[9b] Willhelmi (1948)[10g] and Meyer and Potter (1949).[7]

This increase of phosphorus has been shown by Cuthberson (1942)[13a] and Beattie (1947)[13b] to be related to an increase in the urinary excretion of phosphorus and calcium, an increase of phosphorus in the erythrocytes[16] and in increase in blood creatinin.

Experimental Procedure.—Sixty determinations of total inorganic phosphorus and total calcium in serum were made in 20 patients who underwent operations. Blood was taken twenty-four hours before the operation, immediately after it (ten minutes at most) and twenty-four hours after. All patients received similar diets, containing approximately 1.25 Gm. of phosphorus and 0.65 Gm. of calcium per day.

The method of Youngburg (1930)[17] was used for the determination of the plasma phosphorus level, zinc chloride being used as described by Kuttner and Lichtenstein (1930)[18]. This results in a more intense coloration, thus making it possible to measure exactly small quantities of phosphorus. The modification by Kramer and Tisdall (1933)[19] of the method of Clark and Collip (1925)[20] was used for determination of the serum calcium level.

All patients were given a Rowntree and Geraghty phenolsulfonophthalein test in

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order to obtain information on the possible existence of nephritis,[21] which could produce an increase of plasma phosphorus[22] or at least alter the results. In some cases a complete examination of the urine was also made.

The following operations were performed:

Appendectomy	2
Biopsy of liver	1
Perineorrhaphy	1
Inguinal herniotomy	4
Complete abdominal hysterectomy	2
Skin graft	1
Neurorrhaphy and neuroma resection	1
Abdominal uterine polypectomy	1
Resection of ischiorectal fistula	1
Resection of vesicovaginal fistula	1
Saphenous phlebectomy	2
Bone perforation and extraction of wire	1
Ventriculographic procedure	1

Results: Changes in the phosphorus level occurred in 20 of the cases studied. In 12, an increase was observed; in 8, a decrease. The changes corresponded to the intensity of the stress. The increase in serum phosphorus was 0.2 to 1.52 mg., with an average of 0.86 mg. The decrease in phosphorus was 0.08 to 2.89 mg., with an average of 1.15 mg. Both increase and decrease were independent from the type and extent of the operation performed. The algebraic sum of phosphorus increases was minus 0.29 mg.

Age: 16 patients 22 to 46 years old, with an average age of 32 years, a group of young persons similar to those mentioned by Pincus,[1] an increase of serum phosphorus was observed in 11 and a decrease in 5. Of another group of patients, aged between 50 and 68 years, with an average of 58 years, a decrease of serum phosphorus was observed in 3 and an increase in 1.

In the 20 patients studied, the calcium level changed in 18. In 11 a decrease and in 7 an increase was observed; 14 showed the greatest change during stress and retained the pre-stress level. The other 4 did not show a tendency to return to the pre-stress level, the calcium variation being sustained. The increase in serum calcium was 0.04 to 5.98 mg., with an average of 1.93 mg. The decrease in serum calcium was from 0.04 to 4.8 mg., with an average of 1.31 mg. All changes were independent from the type and extent of the surgical procedures. The algebraic sum of increases and decreases of calcium was plus 0.62.

A decrease in the levels of calcium and phosphorus was noted in 4 cases; an increase of both elements in 3 cases. An increase in one and a decrease in the other element occurred in 11 cases.

COMMENT

1. In our opinion, the effects observed are caused by surgical stress, since variation was produced during the stress period, with return to the pre-stress level twenty-four hours after the operation. Considering this, the reaction of serum phosphorus is more noticeable than that of serum calcium. It is interesting to note that levels of both elements were obtained exceeding the pre-stress level.

2. The preoperative levels in our cases differ from the accepted norms, even though the diet was constant and the renal functional test gave normal results.

3. We have observed increase and decrease of serum phosphorus in man due to surgical operations. This has not been recorded by other authors, who noted only an increase due to different types of trauma. We have found that the decrease of serum phosphorus is related to the age of the patient, especially in the older age groups, which is interesting because of the observation of Pincus,[1] on the difference in the urinary excretion of phosphorus by patients treated with ACTH, which is increased in old persons and decreased in the young owing to retention of phosphorus.

4. In consideration of the inherent factors in surgical stress that may cause the changes in blood phosphorus and account for the variations observed, the following factors must be taken into account:

Local: During operation, tearing of

tissues and cutting of blood vessels occur, causing ischemia and anoxia. Shorr (1943)[23] observed *in vitro* the effect of the anoxia, manifested by an increase of phosphorus and a decrease of phosphocreatin. Allison, Cole and Holmes (1947)[9] observed an increase in the phosphorus of the erythrocytes, with an increase of serum phosphorus; they came to the conclusion that the increase of phosphorus is caused by destruction of the muscular phosphocreatin. Duncan (1942)[24] has observed an increase of circulating creatin due to muscular trauma.

General: The surgical operation produces general effects throughout the anteropituitary-cortico-adrenal system and perhaps, in part, through the parathyroid, which in turn modifies the cortico-adrenal function. Davis and Hulit (1949),[25] Almy and Laragh (1949),[26] Roche, Thorn and Hills (1950)[27] and Roche, Hills and Thorn (1950)[28] reported surgical operations accompanied with changes in the circulatory eosinophils and in the excretion of glucocorticoids. However, the effects produced by ACTH and cortico-adrenal hormones on serum phosphorus and its excretion are contradictory, since some authors observed an increase after the administration of ACTH,[29] others a decrease[30] and still others no variation. Some authors have observed an increase in urinary phosphorus;[31] others detected no changes.[32] In regard to the effect of the cortico-adrenal hormones, Tornblom (1949)[29] observed a decrease in serum phosphorus and some others an increase in serum phosphorus and a decrease in urinary phosphorus.[33] The action of the pituitary gland on blood phosphorus appears to be due to growth hormone, since it has been shown that hypophysectomy produces a decrease in blood phosphorus,[34] the level of which returns to normal or above normal after administration of this hormone. However, it is not known whether the stress produces secretion of other pituitary hormones besides ACTH. It must be noticed that activation of the cortico-adrenal hormones could produce an increase of phosphorus by acting upon the parathyroid. Blumenfield and Clausen (1940)[35] showed the inverse relation between the cortico-adrenal function and the parathyroid. Albright (1943)[36] has expressed the opinion that the osteoporosis following trauma must be considered a manifestation of the alarm reaction. Even in the cases in which the general factors mentioned were responsible for the variations observed by us, it does not explain the reactions of increase and decrease, since it has been established that the homeostatic anteropituitary-cortico-adrenal mechanism does not lose its capacity with age.[37]

Variations in Blood Volume: The changes in blood calcium and phosphorus, in our opinion, are not caused by variations in the blood volume. In several cases an inverse relation between the calcium and the phosphorus level was present. Henstell and Gunther (1945)[38] have observed minimal fluctuations, or none, in the blood volume as a result of surgical operations. Only in cases of severe surgical shock did they note a decrease in blood volume, which returned rapidly to normal levels.

In short, we agree with Pincus that the difference in the reaction of phosphorus between young and older persons must be related to the muscular mass, even though the liberation of pituitary growth hormone and the action of the cortico-adrenal hormones on the parathyroid cannot be ruled out completely until further research in this direction has been completed.

Author's Note: The surgical part of this study took place in the General Hospital of Mexico City. The hematochemical determinations were made at the Instituto de Salubridad y Enfermedades Tropicales. We express our appreciation to Prof. Dr. Gerardo Varela, C.P.H., Director of the Institute; Chem. Eng. Raúl Colorado Iris, Chief of the Biological Chemistry Department; Farm. Chem. Rodolfo Dominguez Leyva, and Biol. Farm. Carmen Ramírez.

CONCLUSIONS

1. Surgical stress in man causes fluctuation in blood calcium and blood phosphorus levels.

2. The variations consist of increase or decrease of both elements; the fluctuations of phosphorus are more noticeable.

3. There seems to be no relation between the characteristics of the operative stimulus and the variations of blood calcium and phosphorus.

4. The types of change in blood phosphorus appear to be related to the age of the patient. The authors observed an increase in young persons and a decrease in older ones.

5. In the author's opinion, the variations of serum phosphorus are caused partly by the action of the surgical stress on the muscular mass, even though the effect of the liberation of the pituitary hormone of growth and the action of the corticoadrenal hormones on the parathyroid cannot be ruled out.

SUMMARY

The changes in blood calcium and blood phosphorus levels during operation have been studied by the authors in 20 cases. Variations of increase and decrease were observed in both elements; the changes in phosphorus levels were the more noticeable. The relation of these variations to the age of the patient and to other possible factors in producing such changes is discussed.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Die Verfasser untersuchen an 20 Fällen die im Verlaufe einer Operation auftretenden Schwankungen des Kalk- und Phosphorspiegels im Blut. Die beiden Elemente zeigen Veränderungen des Anstieges und des Abfalls; die Schwankungen des Phosphorspiegels sind die auffälligeren. Die Beziehung dieser Schwankungen zum Alter des Kranken und zu anderen Faktoren, die dafür verantwortlich sein könnten, werden erörtert.

1. Die Belastung des menschlichen Organismus durch einen chirurgischen Eingriff ruft Schwankungen des Kalk- und Phosphorspiegels hervor.

2. Die Veränderungen bestehen aus Anstieg und Abfall beider Elemente; die Schwankungen des Phosphors sind auffälliger.

3. Zwischen den Eigenarten des speziellen operativen Reizes und den Veränderungen im Kalk- und Phosphorspiegel scheinen keinerlei Beziehungen zu bestehen.

4. Die Art der Schwankungen im Phosphorgehalt des Blutes scheint vom Alter des Kranken abhängig zu sein. Die Verfasser beobachten einen Anstieg bei jungen Individuen und einen Abfall bei aelteren.

5. Die Verfasser glauben, dass die Schwankungen im Phosphorgehalt des Serums zum Teil dem Effekt des chirurgischen Traumas auf die Muskelmasse zuzuschreiben sind, obgleich der Einfluss der Freisetzung hypophysären Wachstumshormons und die Wirkung der Nebennierenrindenhormone auf die Nebenschilddrüsen nicht aussgeschlossen werden kann.

RÉSUMÉ

Les auteurs ont étudié les changements de niveau du phosphore et du calcium chez 20 opérés. Les niveaux du phophore varient d'avantage. Les causes de ces changements sont discutés.

1. Le "stress" chirurgical cause un changement du calcium et du phosphore sanguin.

2. Ce sont les fluctuations surtout en ce qui concerne le phosphore.

3. Le type d'intervention ne semble pas influencer ces variations de niveaux.

4. Les variations du phosphore varie d'après l'âge du sujet; elle augmente chez le jeune, décroît chez les personnes agées.

5. La cause de ces fluctuations sont le "stress" sur la masse musclaire due à l'acte chirurgical, cependant il ne faudrait pas laisser de côté les stimuli des glandes pituitaires et cortico-surrénales sur les parathyroides.

RESUMO E CONCLUSOES

1. As intervençóes cirúrgicas provocam, em muitos casos, desequilibrio das taxas

sanguineas de calci o e fosfore.

2. As variações consistem no aumento ou diminuição das taxas normais, sendo mais acentuadas as do fosfore sanguineo.

3. Parece inexistir nenhuma relação entre as caracteristicas da intervenção praticada e tais variações.

4. Quanto ao fosfore parece existir correlação com a idade do paciente, havendo um aumento nas pessôas jovens e uma diminuição nas mais idosas.

5. Segundo os autôres as variações de fosfore estão ligadas à ação cirúrgica sôbre a massa muscular, como tambem quanto ao efeito da liberação do hormônio pituitario.

RESUMEN Y CONCLUSIONES

Los autores estudian los cambios de los niveles de calcio y fósforo sanguíneos durante la operación en 20 casos. Se observaron variaciones de aumento y disminución en ambos elementos, siendo más notables los cambios en los niveles de fósforo. Se discute la relación de estas variaciones con la edad del paciente, así como con otros factores posibles productores de dichose cambios.

1. El "stress" quirúrgico produce en el hombre fluctuación de los niveles de calcio y fósforo sanguíneos.

2. Las variaciones consisten en aumento y disminución de ambos elementos, siendo más notables las fluctuaciones del fósforo.

3. No parece existir relación entre las características del estímulo operatorio y las variaciones de calcio y fósforo sanguíneos.

4. El tipo de los cambios en el fósforo sanguíneo parece estar relacionado con la edad del paciente. Los autores observaron un aumento en personas jóvenes y una disminución en los viejos.

5. En la opinión de los autores, las variaciones del fósforo sérico son producidas en parte por la acción del "stress" quirúrgico sobre la masa muscular, aun cuando no puede excluirse el efecto de la liberación de hormona hipofisiaria del crecimiento y la acción de las hormonas corticosuprarrenlaes sobre las paratiroides.

RIASSUNTO E CONCLUSIONI

Gli Autori hanno studiato in 20 casi le variazioni del tasso ematico del calcio e del fosforo nel corso di interventi operatori. Variazioni in più o in meno furono osservate in ambedue gli elementi, soprattutto nel fosforo. Vengono discussi i rapporti di tali variazioni con l'età dei pazienti o altri possibili fattori.

1. Il trauma operatorio produce nell'uomo variazioni della calcemia e della fosforemia.

2. Le variazioni consistono in aumenti o diminuzioni e sono sopratutto notevoli quelle della fosforemia.

3. Non sembra vi siano relazioni fra tipo di intervento e livello ematico del calcio e del fosforo.

4. Le variazioni della fosforemia sono in relazione con l'età del paziente, nel senso che nei giovani la fosforemia aumenta, nei vecchi diminuisce.

5. Secondo gli Autori le variazioni della fosforemia sono causate, in parte, dall'azione del trauma operatorio sulle masse muscolari; anche se non si possa escludere lo effetto esercitato dalla liberazione dell'ormone pituitario della crescenza e dall'azione dell'adrenalina sulle paratiroidi.

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Needle Decompression and Temporary Cecostomy for Severe Colon Obstruction

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PIERCING the bowel as a method of decompression dates back to antiquity. There are ancient records indicating that stabbing the bloated intestines of animals through the abdomen was regularly done in an attempt to relieve overdistention.[1] This procedure was also adapted, occasionally, to human beings in a desperate last effort to save life. It is interesting to note that authors of standard textbooks in surgery and therapeutics as late as the nineteenth century (Thomas,[2] 1891, Martin and Hare,[3] 1891 and Treves,[4] 1904) included puncture of an overdistended intestine through the abdominal wall as an emergency measure. However, these writers warned of the hazards of such blind transabdominal needling. They advised using fine hypodermic needles to make as many intestinal punctures as were necessary for relief. The use of large trocars was condemned because the big openings allowed spillage, usually followed by peritonitis, whereas small openings could seal themselves off. Treves recommended celiotomy and the withdrawal of a loop of bowel to allow for a more precise puncture, but advised immediate closure of this opening to avoid leakage.

A most important advance in the relief of intestinal obstruction was the deliberate opening of the bowel to provide a functioning external vent. This was a logical development arrived at from notations to the effect that, since ancient times, patients had survived spontaneous colostomies and enterostomies derived from disease or trauma. It is noteworthy that the original published recommendation for selective and purposeful operative colostomy was made by Littre, a French surgeon, in 1710.[5] Action upon his suggestion was delayed until 1776, when Pillore, another French surgeon, first performed a successful lumbar colostomy for colonic obstruction due to an imperforate anus in a 3-day-old child. Thereafter, colostomy for low bowel obstruction was employed more often. Lumbar colostomy, as advocated and developed by Amussat in 1839 became the standard operation of the pre-Listerian period, principally because of the relative safety of its extraperitoneal approach. Almost fifty years later, about 1880, with the advent of the aseptic era, many surgeons[6] accepted the advantages of the intra-abdominal route of operation for intestinal lesions. Consequently, blind bowel puncture and lumbar colostomy as emergency procedures were gradually discarded and eventually replaced by the intra-abdominal operations. It was still obvious, however, that abdominal surgical intervention for advanced intestinal obstruction too often ended fatally. Therefore, safer approaches to this surgical problem were sought to provide a more favorable outcome. Surgeons of today may find it difficult to comprehend the long sequence of trial and error that took place before it became evident that an initial preliminary enterostomy could relieve the immediate emergency and thereby provide a better opportunity for adequate secondary procedures. Rankin[1] summarized this concept by stating: "It is

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not too arbitrary, I think, to express the opinion that decompression preliminary to extirpation, whether it be medical or surgical, is among the most important fundamental principles in the removal of rectal and colon cancers." This statement epitomizes the course that should be followed by the prudent surgeon in the therapy of colonic obstruction with overdistention, and departure therefrom carries additional and unnecessary hazards that might well be avoided.

Often the employment of gastrointestinal intubation as a medical measure to accomplish decompression of the colon may not prove too effective. The major factor negating the use of tubes for colonic obstruction is the frequent presence of a competent tight ileocecal valve that converts the blocked intestine into a closed loop. Another consideration contraindicating the use of this slow and uncertain measure is the danger of possible spontaneous rupture of the overfilled large bowel.

The next item to be considered is the surgical approach to decompression, namely, a preliminary proximal colostomy, and the choice of the best technical method for its performance. When transabdominal colostomy as a vent operation became accepted and was practiced, various methods of deflation were employed to allow the guided escape of noxious contents from the obstructed bowel. Generally they consisted of immediately introducing and tying a flanged glass or rubber tube into the opened bowel. Unfortunately, the results of many of these operations were too often disastrous, mainly because of uncontrollable peritoneal soiling resulting from manipulation of the thin, fragile and inflated colon.

Wangensteen[7] revived interest in the application of needle puncture to a distended loop of bowel, in a description of his method of aseptic decompressive enterostomy, in which he utilized needle puncture and aspiration to prepare a selected clamped-off loop of bowel for immediate catheter enterostomy. Bancroft and Wade[8] recommended a similar procedure. Even this method has dangers, for in cases of severe involvement the application of rubber-shod clamps to a weakened bowel may cause it to split and rupture.

Our thesis is that *liberation of excess gases alone is the most urgent problem in bowel overdistention resulting from advanced obstruction;* of secondary immediate importance is the evacuation of the liquid and solid content, which can be safely delayed for forty-eight hours or more. To accomplish this, we offer a method that provides an immediate outlet for the confined gases by needle puncture. This is performed by inserting several No. 17-gauge needles into a well exteriorized and walled-off portion of the distended bowel and leaving them *in situ.* This yields immediate, effective, continuous and slow decompression, with practically no soiling. Senn,[9] in his writings, had commented that bowel puncture merely emptied a limited segment of intestine, probably not more than 6 to 8 inches (15 to 20 cm.) to either side of the needle: Aspiration at the same time doubled the extent of the decompressed area. Nevertheless, clinically, we have observed and are convinced that a continuous and adequate initial decompression usually follows the use of these needles alone. This is visibly manifested by progressive collapse of the exteriorized bowel, decreased generalized intestinal distention and systemic relief. After forty-eight hours, when the agglutination of the bowel to the wound affords security against peritoneal contamination, the bowel is widely opened to complete the enterostomy.

Modern colostomy technics vary considerably. They are dependent upon the existing local pathologic condition as well as upon the individual preference of the surgeon. However, the essential objectives are constant:

1. Immediate or delayed decompression of the bowel.[10]
2. Partial or complete diversion of the fecal stream.[11]

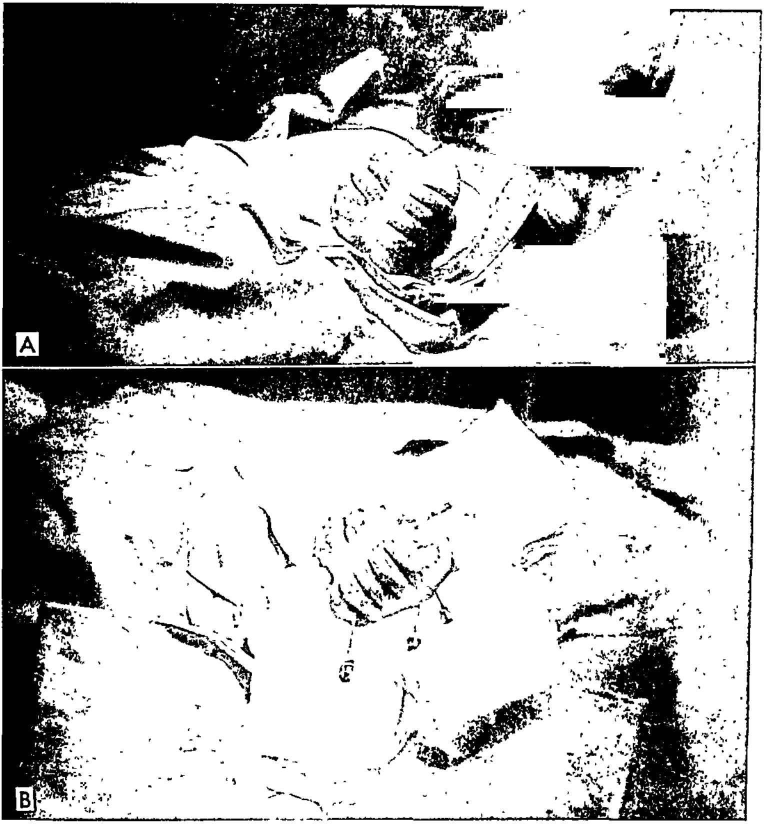

Fig. 1.—*A*, enormously distended cecum and adjoining ascending colon bulging through right-sided muscle-splitting abdominal incision. *B*, dressings placed around exteriorized bowel. Four No. 17 gauge needles puncturing bowel. Deflation beginning.

3. Temporary or permanent colostomy.

To describe or evaluate all the technics and types of colostomy used to satisfy the special requirements and situations needed under the aforementioned groupings is too comprehensive to be presented here and is not pertinent to the objective of this paper. Mainly, our purpose is to direct attention to the value of a special form of emergency and temporary colostomy, namely, needle cecostomy, that prefer for severe obstruction induce lesions distal to the ascen the colon. A d

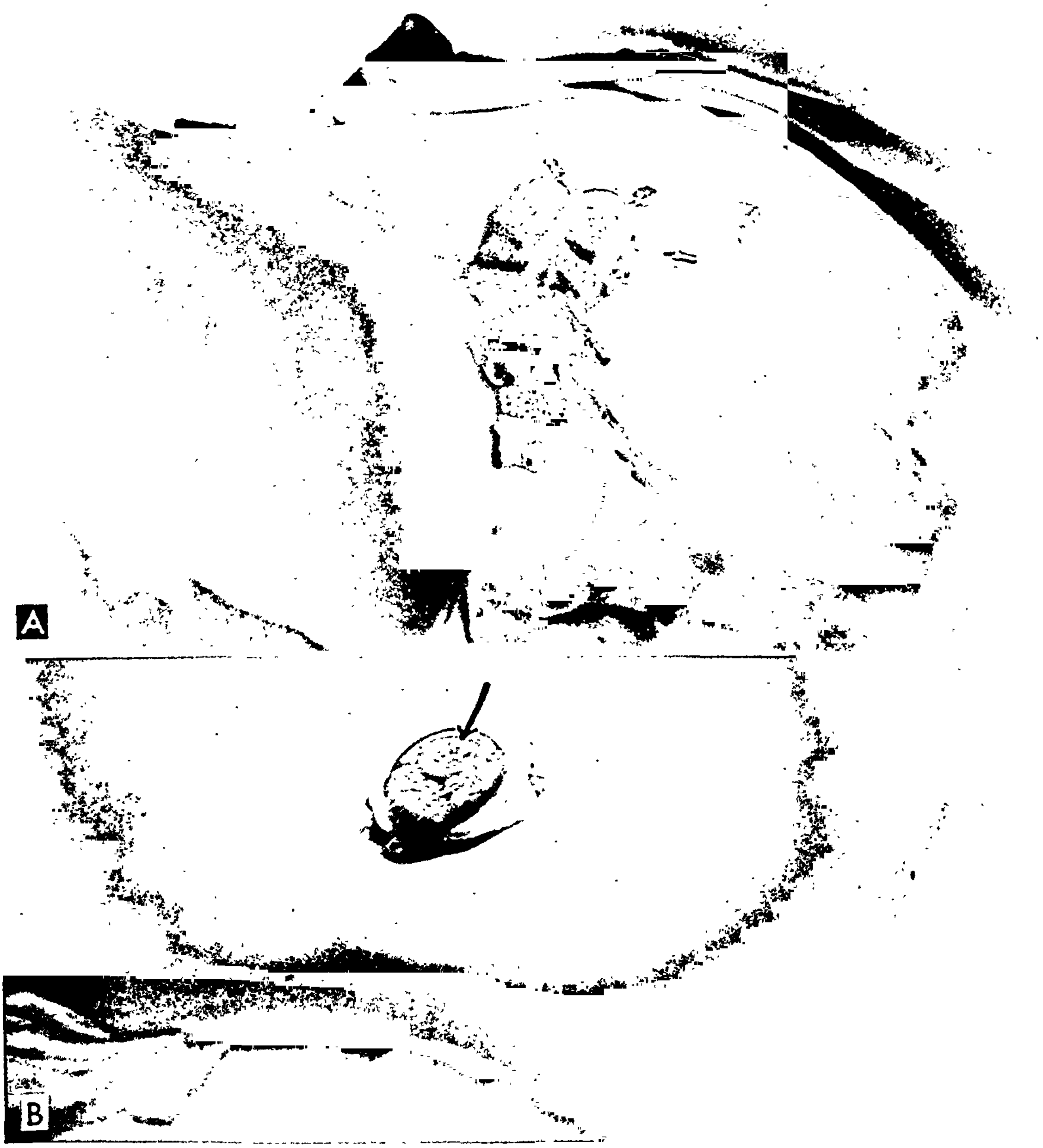

Fig. 2.—*A*, two days after the operation. Bowel deflated. Packing seen in superior angle. Bowel ready for opening with cautery or scissors. *B*, eight days after the operation. Stoma wide open. Mucosa everted. Arrow points to ileocecal opening pouting in medial-inferior aspect of cecostomy.

technic follows: The abdomen is opened through a high, lateral, right-sided and generous gridiron incision. The ballooned cecum is easily located. Its lateral parietal peritoneal attachment is carefully liberated digitally or with scissors, and the cecum with the ascending portion of the colon is freed sufficiently thereby so that it can be gently delivered onto the surface of the wound. Usually, half or more of the diameter of the bowel should be allowed to bulge through the incision (Fig. 1*A*). A sling of rubber tubing may be drawn under the cecum or the ascending portion of the colon to prevent retraction. If too long, each angle of the wound is packed loosely with a gauze sponge or is sutured. If the sides of the exposed cecum are not snug against the abdominal wall, more gauze sponges are placed in this space. With more closely fitted wounds it is unnecessary to introduce any closing sutures or sponges. Now three or more No. 17-gauge needles are used to puncture the distended exteriorized cecal wall at different sites. They remain *in situ* to effect a continuous escape of gas (Fig. 1*B*). The cecum deflates slowly, which is a most desirable effect (Fig. 2*A*). Six hours later, the cecum is inspected. If it is still distended, the needles are readjusted; if blocked, aspiration is done. Two days later, the needles are removed and the now safely isolated bowel is opened liberally along its longitudinal axis with a cautery or scissors. Gradually, the edge of the cecal opening everts, thickens and becomes attached to the skin incision (Fig. 2*B*).

Cecal closure is usually performed several weeks after any subsequent required operation. It is understandable that the interval varies, since it is dependent upon the completion and healing of any future corrective surgical procedure. Also, the patency of the distal portion of the colonic lumen must be assured by a water or barium enema.

COMMENT

In the literature, the mortality figures associated with initial colostomy for acute colonic obstruction remain high. Representative figures are presented by Gabriel and Lloyd-Davies,[12] who noted a general mortality rate of 8.1 per cent after colostomy. Albers and Smith[13] compared the results of cecostomy and transverse colostomy in cases of complete colonic obstruction. Their mortality rate was 56 per cent for cecostomy and 23.5 per cent for transverse colostomy. They also cited Dennis' mortality figures—50 per cent for cecostomy and 7.9 per cent for transverse colostomy. Albers and Smith expressed their dissatisfaction with the poor decompression obtained by cecostomy as compared to transverse colostomy. Our results with the preliminary needle type of cecostomy have been more favorable. There were 2 deaths in our series of 150 cases. One was due to cerebral apoplexy and the other to pulmonary embolism, a mortality incidence of 1.2 per cent. Unequivocally, we are satisfied with needle deflation utilized solely for obstruction of the large bowel uncomplicated by preexisting perforation, gangrene or peritonitis.

Doubtless, contributing to many of the fatalities and to the high mortality rate ascribed to colonic obstruction are factors directly attributable to undue intestinal manipulation at the time of the enterostomy; improper exteriorization or nonexteriorization of bowel, or leakage of contents during the making of a vent or the insertion of a tube into the intestine.

Preference is given to cecostomy, particularly when the left half of the colon is obstructed, because of definite advantages. The cecum can be amply exteriorized; this militates against peritoneal contamination. The needles allow an immediate and continuous release of tension by liberating intraluminal gas. Fluid bowel contents rarely leak out, and any minimal amount is externally trapped and absorbed by the surrounding dressings. The McBurney muscle-splitting incision is usually placed well away from the site of any secondary required surgical operation, which most often is directed toward the left side of the abdomen. Extrusion of the bowel through the wound must also be considered. Gabriel and Lloyd-Davies[14] presented 15 cases of prolapse of the small intestine or omentum through a colostomy wound. Of these, 14 protrusions were through a left rectus incision and only 1 through a left oblique incision. In our series, only once was prolapse of the small bowel encountered.

The disadvantage of a transverse colostomy for immediate relief is [illegible] often requires much more [illegible] dling than does the creation of a cecostomy. Because of its anatomic location, the transverse portion of the colon and its mesentery are frequently adherent to the gallbladder, the liver or the stomach and must be detached to be mobilized sufficiently for proper exteriorization. This dissection is apt to be troublesome and dangerous in the presence of a ballooned bowel with engorged mesenteric vessels.

Objections to cecostomy because of the liquid content as a cause of skin irritation have been expressed by Lockhart-Mummery and others.[13] Some minor irritations of the skin in a small percentage of patients were easily and comfortably controlled by a constipating diet and antidiarrheal medication, combined with cleanliness and local application of protective ointments. Loss of electrolytes from a cecostomy is said to be greater than from a distal colostomy. However, the relief from obstructive symptoms soon permits the patient to resume adequate oral feedings, which averts a chemical deficit. Since this vent is usually created as an emergency procedure and is not destined for long duration, a chronic imbalance of electrolytes is not anticipated. Experience has demonstrated that the entire clinical response is usually one of dramatic improvement, and the discomforts are comparatively minor.

Another stated objection is that a subsequent closure operation is always required because of extensive exteriorization and a wide stoma. The validity of this is minimized by a low mortality figure of 1.2 per cent for the cecostomy and its closure. Deaths that occurred from complications of the primary disease and from a subsequent operation on the colon and deaths not directly due to the cecostomy should not be charged to that procedure.

SUMMARY AND CONCLUSIONS

For severe distal colonic obstruction, the authors describe and recommend a technic of cecostomy that employs (1) full exteriorization and needle decompression and (2) delayed and wide opening of the cecum. In their hands the simplicity, safety and usefulness of this operation have proved to offer superior advantages, and in their opinion it is worthy of interest and trial by others.

RESUMO E CONCLUSOES

Nos casos de obstrução grave, distais, do colon, os autôres descrevem e recomendam uma técnica de cegestomia. Em suas mãos tal metodo tem se revelado simples, indicavel e salvadôra, oferecendo vantagens muite superiores aquelas conseguidas anteriormente com os outres processos.

RESUMEN Y CONCLUSIONES

Los autores describen y recomiendan para la obstrucción colónica grave, la técnica de colostomía que emplea: (1) la exteriorización total y la descompresión con aguja, y (2) la abertura amplia y tardía del ciego. En sus manos la simplicidad, seguridad y utilidad de esta operación ha probado ofrecer ventajas considerables y en su opinión es digna de interés y de ser intentada por otros.

RÉSUMÈ

Un procédé de coecostomie est recommandé par les auteurs, pour soulager d'une obstruction à distance du colon à savoir: (1) l'extériorisation complète du colon avec décompression à l'aiguille et (2) ouverture élargie du coecum. Ce procédé simple a été d'un avantage surprenant pour leurs patients. Ils le recommandent aux autres.

CONCLUSIONI RIASSUNTIVE

Per gli stati di grave occlusione del colon distale gli Autori descrivono e raccomandano una particolare tecnica di cecostomia che prevede la completa esteriorizzazione del viscere e la sua decompressione mediante puntura, seguita, in un secondo tempo, dalla sua ampia apertura.

Nelle loro mani la semplicità, la innocuità e l'utilità di tale intervento ha dimostrato di offrire grandi vantaggi cosicchè pensano che dovrebbe meritare l'interesse degli altri chirurghi.

ZUSAMMENFASSUNG

Zur Anwendung in Fällen von hochgradigem Verschluss des distalen Dickdarms beschreiben und empfehlen die Verfasser eine Technik der Zoekostomie; diese besteht in (1) völliger Exteriorisierung und Nadeldekrompression und (2) einer späteren weiten Spaltung des Zoekums. In den Händen der Verfasser hat dieser Eingriff wegen seiner Einfachheit, Sicherheit und Zweckmässigkeit grosse Vorzüge aufgewiesen und verdient, wie sie glauben, die Aufmerksamkeit und Nachprüfung ihrer Kollegen.

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To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the Journal to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the Seccion en Espanol, which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language. Prompt publication can be greatly facilitated if all manuscripts are typed in double or triple space to allow room for editorial corrections. Your cooperation will be deeply appreciated.

Surgical Uses of Viable Intestinal Segments

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THE reinforcement and the replacement of anatomic structures in animals and man have presented a problem since the time of Hippocrates. In the nineteenth century several events occurred which made possible the first steps toward solving this problem. Ether anesthesia was developed, sterile surgical technic came into being, and the first nontoxic metal alloys were produced. Soon steel, vitallium, and tantalum were being used to reinforce bones. In the twentieth century it became feasible to replace the esophagus and other internal organs with polyethylene and similar plastic materials. Recently attempts have been made to replace blood vessels with metal, plastic and glass devices. Although these nonfunctional substances are temporarily satisfactory, they deteriorate after a time, set up a foreign body reaction or act as foci of infection.

Efforts have been made to establish artificial function, but the results do not act in the same way as the original organ. Hofnagel,[1] as the result of his brilliant experiments, must be given credit for his ingenious innovation of manufactured cardiac valves which can be left *in situ* in animals and in human patients. Their true worth will be determined only after a much longer period of observation.

Evidence showing that the problem of reinforcing and replacing anatomic structures has not been solved satisfactorily is continuing to accumulate. In addition to the sites where substitutes have been tried, there are many structures in the human body, such as the biliary tract, the urinary bladder and large peritoneal defects, for which there has been no means of reinforcement or replacement when needed.

We are attempting to use viable intestinal segments in the thoracic and abdominal cavities in places where other means of reinforcement and replacement have been and are being used and in places where such attempts have not been made before. Since a wide range is covered, our series is incomplete, and our results thus far cannot be used to evaluate the ultimate results. Only long-term observations can determine whether these intestinal segments will eventually be as useful to the general surgeon as the Gillie's skin pedicle graft[2] has been to the plastic surgeon.

Procedure.—In our work, which has been done on dogs, we have observed that segments of either the jejunum or the ileum are satisfactory. After the segment of bowel to be used has been selected on the basis of its being anatomically available to the site of the defect being repaired, the smaller branches of the blood vessels from the intestine are followed through the arcuate arteries to the main branch coming off the mesentery. These small branches are clamped, divided and ligated as they are encountered, the segment of choice being left completely isolated from the rest of the intestine. It is clamped and ligated, and an end-to-end or a side-to-side anastomosis is done, the free intestinal segment being left with its own blood and nerve supply coming directly from the mesentery. The segment has a very long pedicle, since the mesenteric artery and surrounding tissue have been freed up to their origin at the root of the mesentery.

The segment of intestine, with the mucous membrane intact, can be used as it is

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for replacing the esophagus, the biliary structures or the lower part of the genitourinary system. If the segment is to be used as a reinforcing muscular layer to replace absent areas of the diaphragm or to repair the peritoneum, or if it is to be placed around blood vessel transplants, the mucous membrane should be removed. This is easily accomplished with very little bleeding by making an incision through the mucous membrane and freeing it from the surrounding submucosal and muscular layers with a dissecting scissors after incising the segment longitudinally along the antimesenteric border.

COMMENT

A summary of the work covered by this paper is presented in Table 1. Although the observations have been made over a period of two years, our series are still incomplete, since the animals must be kept under observation for many months and our laboratory space has been very limited, necessitating a staggering of our series.

In the thoracic cavity an intestinal segment with its mucous membrane intact can be transplanted into the esophagus to replace an entire segment of the esophagus or to repair a defect. We have replaced the lower third of the esophagus in 3 animals, which are in satisfactory condition after several months. Longmire and others[3] developed this technic in animals and have applied it to man. Such a procedure would be of value in cases of esophageal stricture resulting from caustic agents, as well as in cases of resected esophageal varices and of carcinoma.

There are several methods of replacing or increasing the blood supply to the heart. Beck's operation,[4] by which the blood flow through the coronary veins is reversed to supply blood to the myocardium when the coronary arteries are occluded by arteriosclerotic plaques, appears to be the most effective. The talc granuloma technique[5] and the suturing of the omentum[6] or the pectoral muscle[7] to the heart have been used to increase the blood supply, but most of these preparations fibrose eventually and have not been satisfactory. Experiments in which an intestinal segment was used have shown that the segment does carry a blood supply. It was denuded of its mucosa and was brought up through the pericardial cavity and placed over an area in which an experimental infarct had been produced by ligating the coronary vessels. Since all of this work has been done on animals, only normal hearts have been encountered. One disadvantage to its possible application to the human being is that it is technically more difficult than the other methods. It does produce changes in the electrocardiogram.

Successful thoracic and abdominal aortic grafts are being used by many surgeons.[8] We have used both homologous and heterogenous grafts, consisting of cat and human aortas.[9] The heterogenous grafts were used in dogs with the assumption that any vessel graft is a nonfunctional foreign body which is replaced by fibrous tissue. Our vessel grafts were preserved in modified Tyrode's solution[10] or by rapid freezing with acetone and dry ice.[11] They have so far proved to be as successful as homologous grafts. The intestinal segment was placed around the blood vessel graft to accommodate it to the continual pounding of pressure and to supply it with a smooth muscle layer. Since only the musculature was desired for this purpose, the mucous membrane was removed before the intestinal segment was trimmed to the desired size. It was placed about the graft and extended approximately 1 cm. beyond the suture lines at each end. Animals with blood vessels so reconstructed have lived for about two years without aneurysm formation, and the vessels have continued to function. The musculature has remained viable and responds to drug stimulation at laparotomy.

The repair of diaphragmatic defects is sometimes complicated by the lack of sufficient tissue to close the defect. Segments of intestine with the mucosa removed and the blood supply intact are easily swung up to such defects, with no tech

Experimental Surgical Applications of Viable Homologous Intestinal Segments

Thoracic Cavity

Site of Transplant	*Mucous Membrane*	*Present Methods*	*Results in Animals*	*Theoretical Human Application*
Esophagus	Intact	Plastic tubes, jejunum or stomach transplanted into chest	Satisfactory	Replacement of esophageal segment or repair of defect
Heart	Removed	Talc granulomas, omentum, pectoral muscle transplants, Beck's operation	Satisfactory (early)	Reinforcement and revascularization of myocardium
Aorta	Removed	Replacement with homologous artery grafts	Satisfactory (early)	Reconstruction of thoracic aorta with functioning muscle layer
Diaphragm	Removed	Repair with tantalum, fascia lata	Satisfactory	Repair of diaphragmatic defects

Abdominal Cavity

Site of Transplant	*Mucous Membrane*	*Present Methods*	*Results in Animals*	*Theoretical Human Application*
Aorta	Removed	Replacement with homologous vein or artery	Satisfactory (early)	Reconstruction of blood vessel or repair of defect
Peritoneum	Removed	Repair with plastic membrane or tantalum mesh	Satisfactory	Repair of peritoneal defects
Urinary bladder	Intact	Ureterostomy to skin or bowel	Satisfactory	Replacement of urinary bladder or part of bladder
Bladder and Ureters	Intact	Ureterostomy to skin or bowel	Satisfactory	Replacement of bladder and ureters
Biliary System	Intact	Anastomosis to duodenum or jejunal loop	Satisfactory	Replacement of biliary system
Reversed Segments	Intact	....	Ulcers produced in 60% of animals	Not done intentionally

Thorax and Abdomen

Site of Transplant	*Mucous Membrane*	*Present Methods*	*Results in Animals*	*Theoretical Human Application*
Thoracic and abdominal aorta	Removed	None	Satisfactory (early)	Repair of dissecting aneurism and of thoracic and abdominal aortic aneurisms

culty. Observations on such procedures have not been made for a long enough period to justify evaluation.

Peritoneal defects have been repaired by using intestinal grafts with the mucous membrane removed. In animals these grafts were observed to work better posteriorly and laterally than anteriorly.

However, if used to repair an anterior abdominal wall defect, they would act like a Meckel's diverticulum attached to the abdominal wall. It must be remembered that loops of bowel can be caught around this stringlike mesentery, which contains blood vessels, and an intestinal obstruction could occur. This hazard can be eliminated by cutting the mesentery at a later date, after the graft has "taken."

When the urinary bladder is replaced with intestinal segments, the mucous membrane may or may not be removed. In some animals the entire urinary bladder was replaced down to the trigone. In such cases the segment of intestine must be made long enough to hold the same volume of urine that the full bladder would normally hold. Several of our animals have gone four months with no difficulty in passing urine. An added precaution was taken in some animals by sterilizing the intestine with neomycin for forty-eight hours prior to operation. At laparotomy it was observed that the bowel segment acts as a safety valve, since the bladder becomes hypertrophied above the trigone and in several months is nearly as large as the original bladder. The intestinal mucosa apparently reverts to a more primitive type, probably transitional epithelium.

The urinary bladder and the ureters both may be replaced by using the same technic. Such a procedure could be valuable in handling various types of tumors and is actually easier than replacing the bladder alone.

In the biliary system the gallbladder, the hepatic ducts and the common ducts have been removed, the stubs of the hepatic ducts being left long enough to identify them at the hilum of the liver. A segment of the intestine is brought out retroperitoneally behind the duodenum in such a manner that the peristalsis of the intestinal segment is away from the liver. The segment is sutured to the hilar area with a two-layer technic, surrounding the ducts, and the distal end is brought down to the duodenum. At the distal end a cone is formed by removing a wedge from the antimesenteric border and doing an end-to-side anastomosis between the segment and the duodenum. This forms a dilated biliary system which carries bile into the duodenum by the peristaltic action of the intestine. Since this system has its own blood supply, it will not slough. And end-to-side anastomosis into the duodenum is done to prevent the formation of blind pouches, which would act as reservoirs for particles of food. The peristalsis in the transplant is away from the hilum of the liver, tending to force bile into the duodenum and preventing the duodenal contents from obstructing the biliary flow, as can happen when the jejunum is anastomosed directly to the ducts of the biliary system. The animals in this group have not been followed long enough to make sure that gallstones will not form.

We have previously reported the production of experimental ulcers by reversing the duodenum.[12] The distal end of the duodenum is anastomosed to the antrum of the stomach and the proximal duodenum in the pyloric region is anastomosed to the proximal jejunum, producing physiologic obstruction and hypersecretion of hydrochloric acid. In 60 per cent of the animals, jejunal ulcers developed within six months of the operation. If this method of anastomosis were used in man when a segment of bowel was replaced or when segments were reanastomosed, the peristaltic waves would work against each other to form a physiologic obstruction, with dilatation of the bowel above the anastomosis and a marked delay in emptying time of the intestine.

We have removed the thoracic and abdominal aortas in dogs, using a thoraco-abdominal incision which enabled us to remove the distal half of the descendin
thoracic portion of the aorta and the a
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end. By this means the blood from the proximal thoracic portion was shunted to the two renal arteries, the celiac artery and the superior mesenteric arteries. The segment of thoracic and abdominal aorta was then removed and replaced. The shunts were removed after the 6 anastomoses were completed. The dead section of aorta was covered with a segment of intestine from which the mucous membrane had been removed.

The development of this technic and its application to human beings could provide a means of attacking a dissecting aneurysm of the aorta. The diseased thoracic and abdominal portions of the aorta could be removed and replaced with a suitable aortic graft, and reenforced with a living intestinal smooth muscle layer.

Results.—We have found it possible to mobilize segments of small bowel with the mucosa intact or removed and to transplant these segments to the thorax or the abdominal cavity in various positions. The functional ability of the transplanted segments has been proved at laparotomy with mecholyl, etamon and pamine. The intact intestine was used as a control while the direct effect of the drugs was observed. Because of their broad application and the ease of their use, such viable intestinal segments may become invaluable to the general surgeon if the early promising results in animals are borne out by longer observations and if species variations do not present contraindications to their use in man.

CONCLUSIONS

1. Viable intestinal segments can be used to replace segments of the esophagus, to reinforce and to increase the blood supply of the heart, to produce new thoracic and abdominal aortas with functioning smooth muscle layers, and to repair diaphragmatic and peritoneal defects. These segments have been used to replace entire urinary bladders and ureters and entire biliary systems.

2. Reverse segments of intestine have been used as an experimental means of producing a physiologic obstruction and ulcers in a high percentage of animals.

3. Although early results are promising, they must remain in the form of a preliminary report until they can be studied for a much longer period, after which they may be revised as additional evidence is accumulated.

SCHLUSSFOLGERUNG

1. Lebensfähige Darmsegmente können benützt werden, um Abschnitte der Speiseröhre zu ersetzen, die Blutversorgung des Herzens zu kräftigen oder zu vermehren, um neue thorakale oder abdominelle Aorten mit funktionierender Schicht von glatter Muskulatur zu schaffen und um Lücken im Zwerchfell oder im Bauchfell zu schliessen. Solche Darmsegmente werden auch zum Ersatz ganzer Harnblasen, von Harnleitern und Gallengangsystemen verwendet.

2. Umgedrehte Darmabschnitte sind benützt worden, um an Versuchstieren in einem hohen Prozentsatz physiologische Verschlüsse und Geschwüre experimentell hervorzurufen.

3. Wenn auch die ersten Ergebnisse ermutigend sind, können sie doch nur in der Form eines vorläufigen Berichts erscheinen, solange sie nicht über eine viel längere Zeitspanne hinaus weiterverfolgt worden sind. Später können sie unter Berücksichtigung zusätzlicher Erkenntnisse revidiert werden.

CONCLUSIONI

1. Segmenti vitali d'intestino possono essere usati per sostituire tratti di esofago, per aumentare la vascolarizzazione del cuore, per costruire aorte toraciche ed addominali con tuniche muscolari liscie funzionanti, per riparare soluzioni di continuo del diaframma e del peritoneo, per sostituire la vescica urinaria, gli ureteri, il sistema biliare extra-epatico.

2. Segmenti d'intestino rovesciati sono stati sperimentalmente impiegati per produrre occlusioni ed ulcere in un alta per-

centuale di animali.

3. Per quanto i primi risultati siano promettenti, essi vengono comunicati soltanto in via preventiva fino a quando non siano stati studiati più a lungo, e dopo di essere stati rivisti alla luce di un'ulteriore esperienza.

CONCLUSIONES

1. Pueden usarse segmentos viables de intestino para reemplazar segmentos de esófago, para reforzar y aumentar la vascularización cardíaca, para producir nuevas aortas torácicas y abdominales con capas musculares lisas funcionantes, y para reparar defectos diafragmáticos y peritoneales. Estos segmentos han sido usados para reemplazar vejigas urinarias completas, ureteros y sistemas biliares completos.
2. Segmentos invertidos de intestino se han usado experimentalmente para producir obstrucción fisiológica y úlceras en un gran porcentaje de animales.
3. Aun cuando los resultados tempranos son prometedores, deben permanecer como comunicación preliminar hasta que puedan ser estudiados por un tiempo mayor, después del cual podrán revisarse conforme se acumule evidencia adicional.

CONCLUSIONES

1. Pode se usar segmentos intestinais para substituir segmentos esofagianos, para reforçar e estimular o suprimento sanguineo do coração, para produzir novas aortas toracicas ou abdominais, para reparar deformidades diafragmaticas e peritoneais. Tais segmentos foram tambem usados para substituir bexiga e uretereos, e bem assim o sistêma biliar.
2. Segmentos invertidos do intestino foram usados como meio experimental na produção de obstruções fisiologicas e ulceras numa alta porcentagem de animais.
3. Tais experimentaçoes devem continuar a sêrem processadas e estudadas longamente, afim de que os seus resultados sejam convenientemente apreciados e melhormente julgados.

RÉSUMÉ

Des portions viables de l'intestin peuvent remplacer l'oesophage, renforcer ou augmenter l'apport sanguin du coeur même remplacer l'aorte thoracique et abdominale et réparer certains défauts du diaphragme et du péritoine. On s'en est servi déjà pour remplacer la vessie, les uretères et les canaux biliaries. Chez les animaux, ils servent à la production expérimentale d'ulcère et d'obstruccion intestinale. Même si les résultats sont bons, ces essais sont encore au stade expérimental

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Chronic Ulcerative Colitis

Complications; Results of Treatment

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CHRONIC inflammatory lesions of the large bowel have given physicians, particularly the proctologist and the gastroenterologist, much concern. These lesions may be localized to a small segment of the colon or they may be so extensive that almost the entire colon and a portion or portions of the small intestine are involved. It is the chronic inflammatory lesion with which we are concerned in this presentation.

The etiologic factors in some types of chronic ulcerative colitis can be determined with the aid of the roentgenologist and the pathologist, but in about 25 to 30 per cent of the cases the primary cause cannot be elicited. In my opinion nonsurgical treatment, consisting principally of rest in bed, low residue (high protein and high carbohydrate) diet, intravenous transfusions of whole blood, plasma or amino-acids, and vitamin therapy, together with the use of certain antibiotics and chemotherapeutic agents, has produced the best results and has proved most conducive to cure. When thorough medical treatment fails, surgical intervention is required to relieve or cure the intractable condition.

It is unnecessary to elaborate upon the known medical treatments of chronic ulcerative colitis; however, I should like to emphasize the importance of adequate surgical management of the colon, instituted earlier than has been customary. When sufficient medical treatment under the careful supervision of a good proctologist or gastroenterologist produces unsatisfactory results, the patient should be advised that only surgical treatment can promise cure. However, the patient should be told in detail of the necessity of wearing an ileostomy bag.

Frequently inflammatory lesions of the large bowel are complicated by pathologic conditions in the colon itself or arising from some other systemic disturbance. When I have been unable to determine the cause of the symptoms or to cure the condition by medical treatment, I have been satisfied to designate the latter as "intractable, nonspecific, or idiopathic" chronic ulcerative colitis. These terms are admittedly not helpful and are, in fact, rather misleading; but their vagueness cannot be avoided, since the condition itself is vague until its cause is discovered. Invariably a combination of causative factors is present, and lesions produced by the continued chronicity of the disease can be obliterated only by surgical treatment, which may restore health to a patient whose condition has been considered incurable for a number of years.

Pathologic conditions complicating chronic ulcerative colitis are frequently encountered and may assume serious proportions. After careful study to determine whether they originate in the colon itself or arise from other systemic disturbances, they should be treated promptly. Polyps, strictures, perforations, hemorrhage (massive at times), abscesses with fistulous formations and malignant change are the complications most frequently encountered Other systemic disorders not directly connected with the gastrointestinal tract, such as cardiorenal changes, nutritional deficiencies and arthritis, may occur in conjunction with chronic ulcerative colitis. They may develop independently of the colonic lesions or occur as a

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result of the general toxemia or lowered resistance associated with chronic ulcerative colitis.

A very important factor in many cases is the apparent lack of proper psychosomatic approach. Another unfortunate aspect of treatment has been that the general practitioner, because of indifference or lack of investigation, has made the unqualified statement to the patient that "a colitis" (or more often, "a spastic colitis") is present, although the only symptom is slight tenesmus or the passage of variable amounts of mucus in the stools. Rarely is proper proctologic study ever given or examination suggested. Careful study and treatment plus the application of ordinary common sense on the part of the physician, who should encourage the patient to talk of his own special worries, will produce a more cooperative attitude; the patient will more readily agree to follow the treatments prescribed, and the best possible results from the combined efforts of physician and patient may be expected.

Varying degrees of hemorrhage are observed in all cases of chronic ulcerative colitis, but it is seldom (1:200) that massive hemorrhage requiring surgical intervention is encountered. In these cases it has been my experience to observe a coexisting malignant condition.

Perforation is rare (0.74 per cent), but when it does occur, the process may be rather slow and walling off of the lesions may ensue. I have observed 6 cases of perforation resulting from instrumentation, but early surgical intervention prevented serious complications and recovery was uneventful. Usually the walls of the colon in the presence of chronic ulcerative colitis are thickened, and I have observed, as consultant, 4 cases in which there were stricture, previous abscess formation and malignant change. Accidental perforation was also observed; it has occurred even under the supervision of capable endoscopists.

Stricture may occur in any portion of the infected area. Repeated barium study and 10 to 12 inch (25 to 30 cm.) proctoscopic investigation will usually locate these lesions. Surgical intervention is necessary when obstruction is imminent or when there is indication of early interference with the fecal current. The development of stricture, as well as other complications associated with chronic ulcerative colitis of long duration, could have been prevented by early colectomy. Stricture in the terminal 10 inches (25 cm.) of the colon may be revealed by digital and instrumental examination, but beyond this point it is discovered by the roentgenologist or by the pathologist at the autopsy table.

Diverticulitis is rarely observed in cases of chronic ulcerative colitis, but abscess and fistula formation occurred in 3 per cent of the cases in this series. It is known that the tissues composing the walls of the infected colon become infiltrated and weakened when permeated by infection. Consequently, leakage or perforation, with abscess formation, may readily occur. Drainage or discharge usually penetrates the lumen of the bowel; however, because of approximation and extension of the infection, it may result in fistula formation with other neighboring bowel segments, the vagina or the bladder. Abscess formation is more frequently localized, and drainage usually suffices. Surgical repair of a fistula is often a precarious procedure and may require a staged operation.

In my series of 425 cases of chronic ulcerative colitis, observed in private practice from 1940 to 1950, the incidence of carcinoma was 4 per cent. It is my opinion that this is too low a percentage to be accurate, because I was unable to follow up many of the patients after a number of years. Had I been able to follow all the patients carefully, I am convinced that the presence of malignant disease would be revealed in over 10 per cent. It is obvious that early ileostomy with complete colectomy will practically eliminate the possibility of malignant change and the many other aforedescribed complications. The association of polyps with chronic ulcerative colitis is the most frequent complication observed, and, if one accepts the dictum that all polyps or adenomatous growths must be regarded as precancerous, no consideration can be shown them. Radical fulguration through the sigmoidoscope should be instituted whenever possible. No attempt to save the rectum and later do an ileosigmoidostomy has proved satisfactory. Polyps were present in approximately 9 per cent of the cases in this series, but the smaller polypoid lesions were amenable to removal by snaring or fulguration.

Although pregnancy is not a pathologic complication in a patient with chronic ulcerative colitis, it may occur in conjunction with it. Colitis may occur after conception, but in the large majority of cases it does not appear to have any effect on the pregnancy. Kleckner Jr., Bargen and Banner in 1951 stated, "It is our opinion that patients who have chronic ulcerative colitis should be advised to avoid pregnancy unless the disease has been in a state of remission for a long time."[3]

SUMMARY

In cases of chronic ulcerative colitis 25 to 30 per cent of the patients require more than medical treatment. It is known beyond doubt that radical surgical intervention is demanded for cure. Complications occur in the infected areas as superadded factors, mainly because of delay in treatment, and usually they are observed in association with colitis of long duration. Prolonged hospitalization, lack of finances, an adverse attitude in the patient (because of ileostomy) and lack of good surgical-radiologic-anesthetic teams prove stumbling blocks to surgical treatment, which is the only possible cure of ulcerative colitis when medical treatment fails. Even if complications are not considered, only early preliminary ileostomy and later colectomy will produce the favorable results we desire.

RESUMO

O autôr salienta que em 25 a 30% dos casos de colite ulcerativa crônica, é indispensavel, não somente o tratamento médico, mas, sêbretudo uma inntervenção cirúrgica radical para a cura respectiva.

Discute todos os fatôres de ordem médica e social que complicam tais casos, complicações graves muitas vezes, sendo a técnica indicada a ileostomia previa seguida de posterior colectomia.

RESUMEN

Del 25 al 30 por ciento de los casos con colitis ulcerativa crónica, requieren más que tratamiento médico. Es bien conocido que la intervención quirúrgica radical se requirere para la curación. Las complicaciones se presentan en las areas infectadas como factores sobreagregados, principalmente en caso de retardo terapeútico y se observan en asociación con la colitis de larga duración. La hospitalización prolongada, dificultades económicas, actitudes adversas del paciente (a causa de la ileostomía), y la falta de un buen sistema quirúrgico-radiológico-anestésico, son tropiezos que bloquean al tratamiento quirúrgico, el que constituye la única posibilidad de curación de la colitis ulcerativa, una vez que ha fracasado el tratamiento médico. Aun cuando no se consideren las complicaciones, unicamente la ileostomía y la colectomía posterior producirán los resultados favorables deseados.

RIASSUNTO

Nel 25-30% dei pazienti affetti da colite ulcerosa cronica le cure mediche non bastano in quanto, per raggiungere la guarigione, ormai non c'è alcun dubbio, è necessario l'intervento chirurgico. Possono verificarsi complicazioni nelle zone ove esistono fatti infettivi, sopratutto in rapporto al ritardo con cui è stata praticata la cura e, di solito, allorchè esistono coliti di lunga durata. L'ospedalizzazione prolungata, la mancanza di mezzi e di una equipe formata da un chirurgo, un radiologo e un anestetista esercitati ed affiatati tra loro, frappongono seri ostacoli alla cura chirurgica che, quando la cura medica abbia

fallito, è l'unica possibile terapia della colite ulcerosa. Anche senza tener conto delle possibili complicazioni, soltanto l'ileostomia, seguita più tardi dalla colectomia potrà dare i risultati desiderati.

ZUSAMMENFASSUNG

In 25 bis 30 Prozent der Kranken, die an *chronischer geschwüriger Dickdarmentzündung* leiden, kommt man mit medizinischer Behandlung nicht aus. Radikale chirurgische Behandlung ist zur Heilung zweifellos erforderlich. Komplikationen kommen in den infizierten Gebieten als aufgepfropfte Faktoren hauptsächlich als Folge von Verzögerungen in der Behandlung vor und werden im allgemeinen in Fällen von lange bestehender Kolitis beobachtet.

Die Anwendung chirurgischer Behandlung, die, wenn medizinische Mittel versagen, die einzige Möglichkeit zur Heilung der ulzerativen Kolitis bietet, wird behindert durch ausgedehnten Krankenhausaufenthalt, Geldmangel, Widerstand des Kranken (wegen der Furcht vor der Ileostomie) und durch den Mangel an guten aus Chirurgen, Roentgenologen und Anasthesiologen zusammengesetzten Arbeitsgruppen. Auch in Fällen, wo Komplikationen nicht in Betracht gezogen werden, stellen die präliminäre Ileostomie und die später folgende Dickdarmresektion das einzige Verfahren dar, das zu den gewünschten günstigen Resultaten führt.

RÉSUMÉ

25 à 30% des patients souffrant de colite ulcéreuse chronique demandent plus qu'un traitement médical. Seul le traitement chirurgical radical est curatif. Les complications dans les régions infectées sont accessoires et dues à un retard dans le traitement ou secondaires à de vieilles lésions. Une trop longue hospitalisation, le manque de finance, la mauvaise volonté du patient à subir l'iléostomie, l'absence d'une équipe coordonnée de radiologistes, de chirurgiens et d'anesthésistes sont autant de facteurs qui causent l'échec dans le traitement définitif de la colite ulcéreuse même *sans complications. L'iléostomie précoce* puis la colectomie peuvent seules amener une guérison

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Treatment of Comminuted Colles' Fracture

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THE common injuries of the wrist known collectively as Colles' fractures are too often considered of minor importance, and satisfactory results are usually taken for granted. Statistical reports on these fractures, however, reveal a deplorably large percentage of poor results. Follow-up examinations of such injuries show that many patients have permanent deformity and weakness. Although most of the typical Colles' fractures are found to have been corrected, a great many of the comminuted type of fractures of the radius have not been reduced, and permanent disability is the consequence.

Importance of Differentiation. — There is much confusion in the treatment of fractures near the wrist and in the evaluation of their results, because the term "Colles' fracture" is commonly used for *all* breaks in the lower end of the radius. The fracture originally described by Abraham Colles is located "one and a half inches above the carpal extremity of the radius," with characteristic posterior displacement of the distal fragment, producing a typical deformity. To reduce the displacement Colles recommended manual traction, the surgeon "locking his hand in that of the patient." Surgeons today have no great difficulty in correcting this type of fracture by manipulation and the application of some form of splinting. The really troublesome injury is characterized by comminution; this is not a Colles' fracture, being more distal and involving the wrist joint. Statistics show that the comminuted fracture is much more common than the true Colles' fracture, White having found an incidence of 74 per cent in his series. The severe squashing of the bone and "telescoping" of the fragments cannot be treated by manipulation; furthermore, even after reduction such a fracture is difficult to immobilize satisfactorily, as it is unstable and there is a decided tendency to redisplacement. Injudicious manipulation not only may fail to reduce the displacement but can even increase the damage to this spongy portion of the bone. Every surgeon remembers cases in which roentgen films of such fractures showed reduction after manipulation and the application of plaster but in which later, when the cast was removed, showed recurrence of the deformity. Thus it is evident that the many poor functional results and deformities following fractures of the distal end of the radius are caused by failure to differentiate simple injuries *above* the wrist joint (Colles' fractures) from comminuted fractures that *involve* the wrist joint, and failure to choose the proper treatment for the individual case.

Variation in Treatment.—Many of the current textbooks on fractures do not classify these injuries separately nor do they make any differentiation in their treatment. For instance, Watson-Jones does not separate the typical Colles' fracture and the comminuted fracture, and advises manipulation and immobilization with plaster for both forms. He has stated, "The reduction of Colles' fracture presents no difficulty, but the application of a plaster cast which is tight enough to prevent redisplacement, and not so tight as to interfere with the circulation, demands skill and experience." This prominent author expresses a rather common opinion. Similarly, Key and Conwell have recommended manipulation and manual traction followed by immobilization

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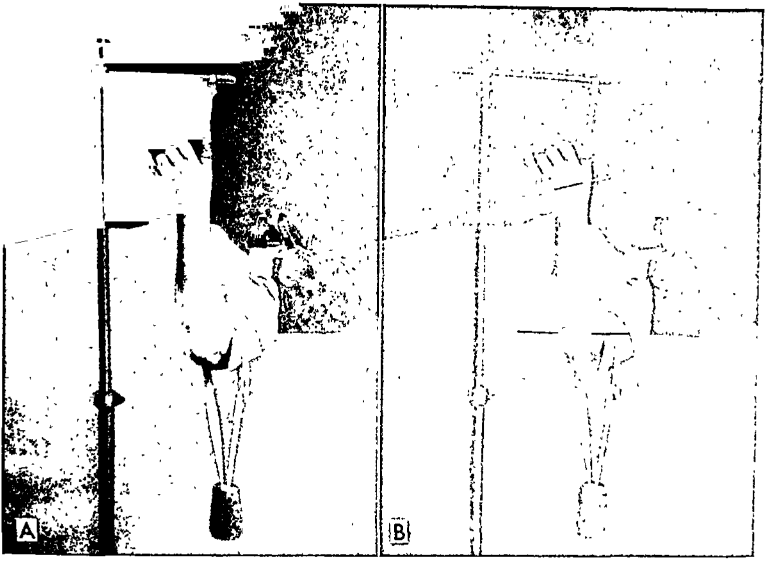

Fig. 1.—*A*, traction with finger trap on thumb for reduction of comminuted fractures of the radius. This traction also corrects lateral shifting at the wrist which accompanies fracture of ulnar styloid or severe ligamentous damage. *B*, with traction maintained, a Kirschner wire is drilled through metacarpal bone of thumb, and another wire is drilled through proximal end of ulna.

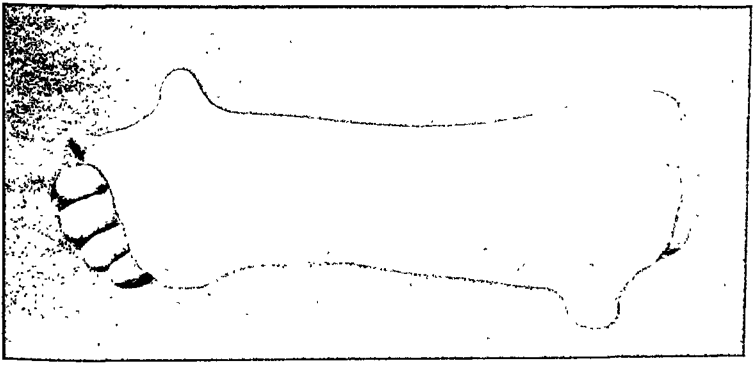

Fig. 2.—Padded cast applied during traction, including two Kirschner wires. The limb is then removed from traction frame. Plaster extends to the knuckles but does not include the elbow.

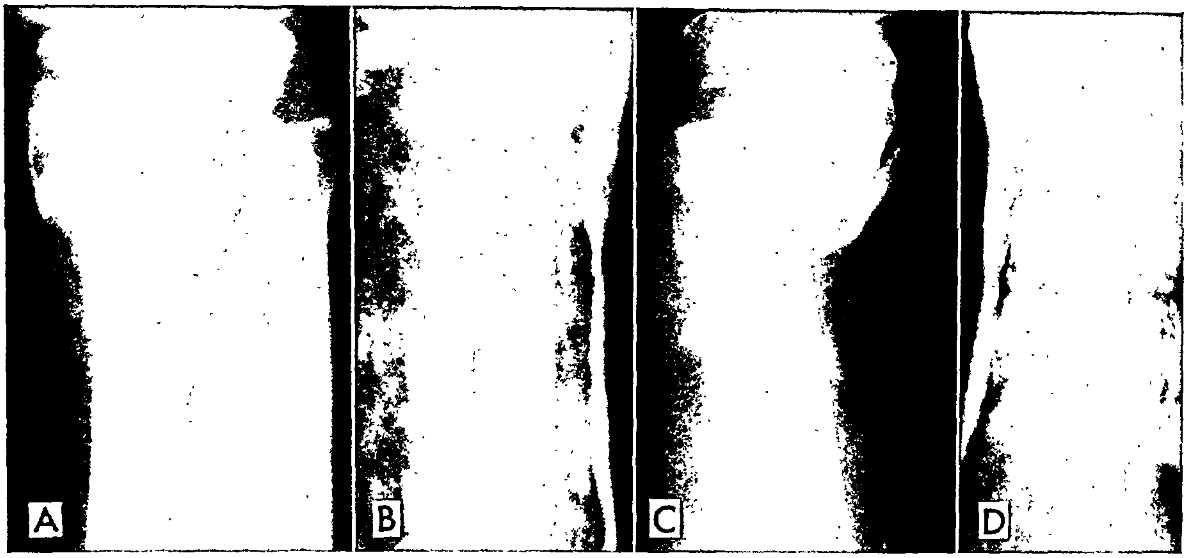

Fig. 3.—Severe fracture, with comminution of distal portion of radius and fracture of ulnar styloid. *A*, anteroposterior view before traction; *B*, correction by traction; *C*, lateral view before traction; *D*, correction by traction.

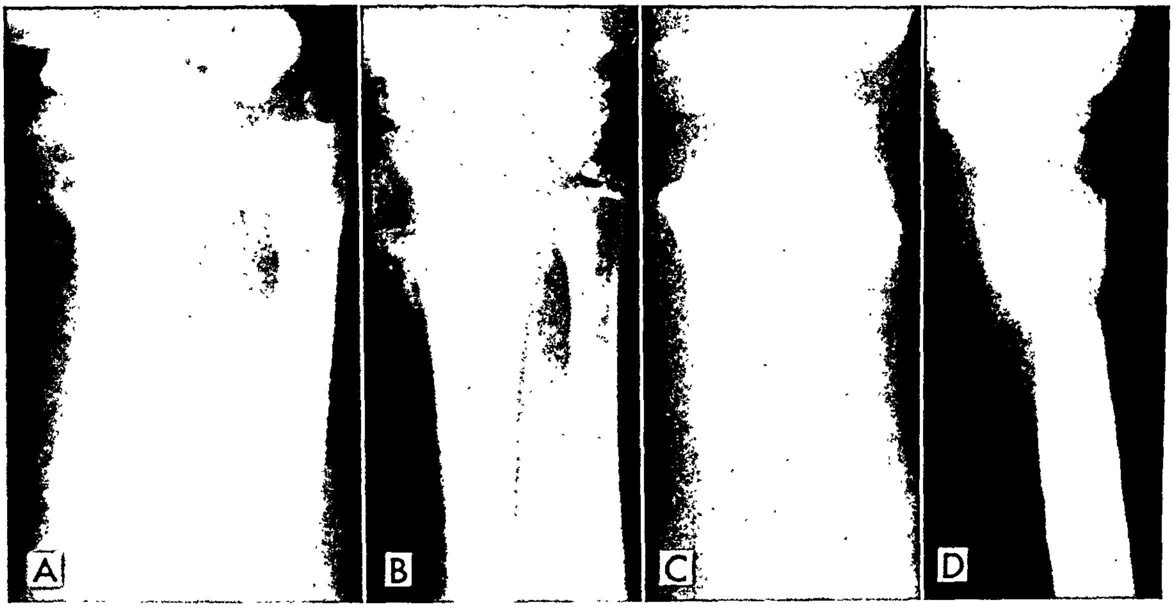

Fig. 4.—Severe fracture with comminution and impaction of distal portion of radius and fracture of ulnar styloid with lateral shift. *A*, anteroposterior view before traction; *B*, correction by traction; *C*, lateral (oblique) view before traction; *D*, correction by traction.

with plaster for all of these fractures, without differentiation.

As an example of the wide variation in treatment, one large clinic admits patients with comminuted fractures of the radius, inserts a Kirschner wire across the metacarpal bones, and applies balanced traction in bed for four weeks. A satisfactory ambulatory form of treatment for the comminuted fractures was described first by Bohler. This consists of drilling a Kirschner wire through the second and fifth metacarpal bones and another through the proximal end of the ulna;

then, while traction is made on the metacarpal bones, a cast is applied to include the wires for transfixion. Many others have found Bohler's method satisfactory. Anderson uses an external fixation splint, inserting a pin in the first metacarpal bone and two pins in the shaft of the radius. Hammond recommends the Bohler method of traction-transfixion for severe and moderate comminution but extends the cast upward to immobilize the elbow; with less comminution, in his opinion, it may be possible to maintain reduction by a very efficient plaster cast. Carothers and Berning have described a simple method, in which they make traction on only the thumb, and during this traction apply an unpadded cast.

So much variation in treatment of these fractures indicates a need of standardization. There is evidence, in many statistical reports that deformity and permanent disability are common. For instance, Gartland and Werley observed that 60 per cent of the patients they examined a year and a half after injury had most of the original deformity. They concluded that immobilization of such fractures by plaster alone was not adequate, although in many cases the displacement apparently had been reduced at the time of primary treatment.

Author's Method.—As with other fractures that involve joints, a satisfactory end result depends mainly on complete reduction followed by adequate fixation. I have simplified the treatment of these injuries by combining the traction-transfixion method originally described by Bohler with simple traction on the thumb as advocated by Carothers and Berning. With the patient's elbow held flexed in an upright position, vertical traction is made on the radius with a finger trap fastened only to the thumb. This corrects the shortening of the radius and the ulnar shift at the wrist. While the pull is maintained, a Kirschner wire of medium thickness is drilled transversely through the metacarpal bone of the thumb, and a simi-

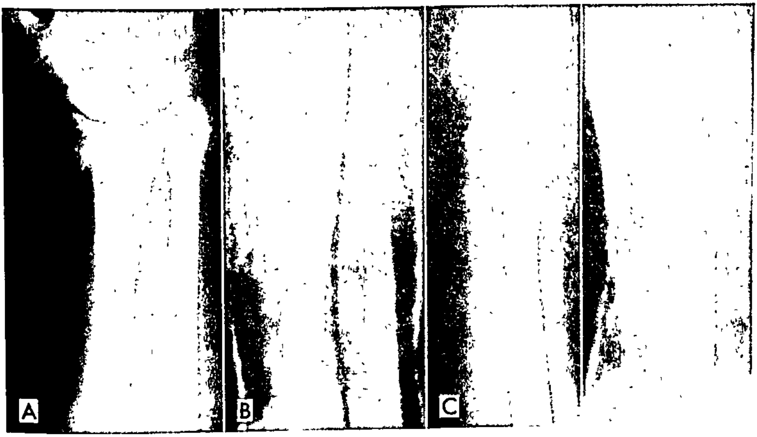

Fig. 5.—Comminuted fracture of distal portion of radius and fracture of ulnar styloid. *A*, posterior view before traction; *B*, correction by traction; *C*, lateral view before traction; *D*, tion by traction.

lar Kirschner wire is drilled through the upper portion of the shaft of the ulna. Then sheet cotton bandages and plaster are applied in such a manner as to include the two wires. The cast extends from the metacarpophalangeal joints of the fingers to the flexure of the elbow, with the wrist in normal position. Neither the end joint of the thumb nor the elbow joint is included in the plaster. Traction on the thumb is removed after the cast has hardened.

Follow-Up Treatment.—Little follow-up treatment is necessary, because there is a remarkably free range of voluntary movement of the thumb and fingers, and elbow movements are not restricted. The cast should not be changed, because there is a decided tendency to shifting of the fragments, with recurrence of the deformity. After eight weeks, when the fracture has united, the plaster and wires are removed; then an anterior splint and an ace bandage are worn part of the time for two additional weeks.

This form of treatment has been used routinely for comminuted fractures of the distal end of the radius in the fracture service at this hospital during the past four years, with satisfactory reduction and good function. There have been no complications, and the patients have been relieved of pain and swelling from the beginning of treatment.

SUMMARY

Every fracture of the distal portion of the radius should be treated according to its individual requirements. Comminuted fractures involving the wrist joint must be clearly differentiated from typical Colles' fractures. Advantages of the simple form of traction-transfixion described by the author for comminuted fractures are the certainty of reduction and adequate immobilization, the absence of complications and the satisfactory end results.

RESUMEN

Toda fractura de la parte distal del radio debe ser tratada de acuera sus requerimientos individuales. Las fracturas conminutas de la articulación del puño deben ser diferenciadas claramente de las fracturas típicas de Colles. Las ventajas de la forma simple de tracción-transfixión descrita por el autor para las fracturas conminutas, son la seguridad de reducción y la mobilización adecuada, la ausencia de complicaciones y los satisfactorios resultados finales.

RESUMO

Todas as faturas da extremidade distal do radio devem sêr tratadas encarando-se os caracteres individuais dos fraturados. Deve haver uma exatada diferenciação entre as fraturas cominutivas juxta-articulares das fraturas típe Colle. O autôr descreve as vantagens dos diversos tratamentos a sêrem adotados em tais casos, detalhando os resultados observados.

ZUSAMMENFASSUNG

Jede Fraktur des distalen Endes des Radius sollte nach den Erfordernissen des Einzelfalles behandelt werden. Brüche des Handgelenks mit mehr als zwei Fragmenten müssen klar von der typischen Radiusfraktur unterschieden werden. Die Vorteile der einfachen vom Verfasser beschriebenen Form der Traktions- und Transfixionsbehandlung der Frakturen mit mehreren Bruchstücken liegen in der Sicherheit der Einrichtung des Bruches, der zuverlässigen Ruhigstellung, im Ausbleiben von Komplikationen und im Erzielen günstiger Endsultate.

RIASSUNTO

Le fratture dell’epifisi distale del radio vanno curate con metodi adeguati alle particolari caratteristiche del caso. Le fratture comminute interessanti l’articolazione del polso vanno attentamente distinte dalle fratture tipiche di Colles. I vantaggi del metodo descritto dall’Autore per la cura delle fratture comminute consistono nella certezza della riduzione e della

contenzione, nell'assenza di complicazioni e nei buoni risultati.

RÉSUMÉ

Toute fracture de la portion distale du radius devrait avoir une attention particulière. Une fracture comminutive intéressant le poignet être différenciée d'avec celle de Colle. L'auteur suggère le procèdè de traction par transfixion afin d'éviter toute complication dans les fractures comminutives.

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The Oscillating Sign as an Aid to Differential Diagnosis of Acute Abdominal Disease

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THE difficulty of determining whether muscle splinting over a suspected emergency surgical condition is objective or is subjectively controlled by the patient is a problem with which every examining doctor is familiar. The nervous and apprehensive patient, the hysterical patient and the child present problems that present a distressing obstacle to surgical evaluation of an abdomen. The observant and conscientious surgeon, with a good history for what appears to be an obvious diagnosis, will often, on examination, find himself unable to arrive objectively at the conclusion which intuitively and by experience he feels he must obtain. This is largely due to lack of the patient's cooperation.

Spasm of the rectus muscle voluntarily controlled must be differentiated from the involuntary spasm by which the same muscle is reflexly splinted to control and protect an underlying intra-abdominal surgical disease. This difficulty of diagnosis is most common in cases of appendicitis and represents a problem, particularly in children. Here the subjective symptoms of fear are prevalent; children therefore refuse to admit, even on pressure of the examining hand, the presence of pain or tenderness.

It has been my custom to flex the child's thighs on the abdomen with both knees bent, the heels resting on the bed, to place the palm of my right hand on the top of both knees and, while moving the knees to and fro, to keep my left hand pressed over the spot of suspected surgical disease; i. e., in the circumstances aforedescribed, over McBurney's point. It has been my observation that if one does this gently, pressing down with the left (examining) hand, the muscle guarding due to the patient's apprehension will subside as this rhythmic to-and-fro pull on the abdominal wall relaxes the initial spasm of the rectus and other abdominal muscles. However, if there is intrinsic intra-abdominal disease, the hand descends a certain distance only, and then the muscle guarding prevents its further downward movement, which eliminates all doubt. It is my conclusion, from abdominal examinations performed during the past eleven years, that this technic of abdominal examination is a valuable aid to diagnosis of intra-abdominal emergency conditions, especially of acute appendicitis in children.

In a series of cases studied, the temperature, leukocytosis, nausea, vomiting, previous history and history of onset of the potential surgical problems have been of varying importance. In several instances the fever and leukocytosis were at variance with the pathologic condition observed at operation and in the laboratory. In these cases the oscillating sign was either doubtful or negative, but it was deemed expedient to operate. In the future more reliance on this sign might limit or at least help to determine the emergency nature of the surgically diseased abdomen. Cases of appendicitis are here presented, since this condition is the most frequent single surgical emergency. However, the method is applicable to all

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intra-abdominal diseases, for essentially it is a method of differentiating between voluntary splinting and muscle guarding due to an intrinsic, involuntary intra-abdominal insult. And, since all visceral affronts are referred, usually to embryologically related areas or areas with which the affected viscera have co-originated, it is obvious that any abdominal site of spasm may be investigated by this method.

REPORT OF CASES

CASE 1.—R. N., a white man aged 23, was admitted to the hospital on May 23, 1950. He had had para-umbilical cramps eleven hours earlier, followed by localization of the pain to the right lower abdominal quadrant, with nausea but no vomiting. A similar attack, with pain in the same quadrant, had occurred about five years earlier. There was no urinary dysfunction.

Examination of the abdomen revealed muscle spasm, with tenderness over McBurney's point. Spasm was relieved with the aid of the oscillating sign, which was equivocal.

The erythrocyte count was 4,520,000 per cubic millimeter of blood; the leukocyte count was 9,850, with 75 per cent polymorphonuclears, 20 per cent lymphocytes, 3 per cent monocytes and 2 per cent eosinophils. The impression was that of acute appenditicis. Appendectomy was performed. The pathologic diagnosis was chronic appendicitis.

Comment: This patient had a definite history of appendicitis and of one earlier attack. The laboratory data were "borderline," but the oscillating sign was equivocal, and chronic appendicitis was the actual condition present.

CASE 2.—L. K., a white woman aged 35, was admitted to the hospital on May 23, 1950. She had had pain and cramps in the right lower abdominal quadrant for the past thirty-six hours, accompanied with nausea but without vomiting. A similar attack had occurred five days before, and there had been repeated pain in the right side for years.

The menses were regular, occurring every twenty-eight days. The patient had been delivered of a child on May 14, the birth being regular and normal. There were no unusual signs or symptoms referable to the urinary tract. A miscarriage had taken place two years prior to admission, and a cervical polypectomy had been performed a year thereafter.

Tenderness and muscle splinting were elicited over McBurney's point. There was no hernia. Rectal examination gave negative results. The oscillating sign was positive. Vaginal examination revealed some fullness in the right adnexal region. The uterus was retroverted and slightly enlarged. There was no tenderness on movement of the cervix.

The leukocyte count was 6,700 per cubic millimeter of blood, with 64 per cent ploymorphonuclears and 36 per cent stab cells. The impression was that of acute appendicitis and ovarian cyst. Appendectomy was performed. The pathologic diagnosis was acute suppurative appendicitis.

Comment: Here a typical history of appendicitis was associated with normal laboratory data and a positive oscillating sign. Acute appendicitis was present.

CASE 3.—C. C., a woman aged 52, was admitted to the hospital on Aug. 2, 1950. She had had pain in the right side for five or six days, localized to the region of McBurney's point. There was tenderness at McBurney's point, with spasm over the area. There was no rebound. The oscillating sign was equivocal. The leukocyte count was 8,450 per cubic millimeter of blood, with 67 per cent polymorphonuclears and 29 per cent lymphocytes. The impression was that of retrocecal appendicitis. Appendectomy was performed, and the patient had an uneventful convalescence. The pathologic diagnosis was chronic appendicitis.

Comment: In this case the history was difficult to evaluate, yet the pain was sharply localized at McBurney's point for five or six days. Although the laboratory values were normal and the oscillating sign equivocal, operation was performed because of the long duration of the pain and its sharply defined localization. Chronic appendicitis was present.

CASE 4.—J. B., a white girl aged 3 years, was admitted to the hospital on Sept. 19, 1950, after three attacks of colicky abdominal cramps within a period of twelve hours. T was
no diarrhea, and the stools were n
amination of the abdomen reveal
splinting, no rebound and no loc.
though tenderness was present eq
four quadrants. The
ative. There were

Examination of the ears, nose and throat revealed congestion. The lungs were essentially normal. The temperature was 104 F. The leukocyte count was 8,000 per cubic millimeter of blood, with 60 per cent polymorphonuclears, 35 per cent lymphocytes and 5 per cent monocytes. The urine was normal. The impression was that of mesenteric adenitis, with the possibility of appendicitis to be ruled out.

The child was treated with penicillin and fluids. Twelve hours after admission the temperature was normal, with no signs or symptoms of abdominal pain, and she was discharged with a diagnosis of mesenteric adenitis.

Comment: In this case the history was equivocal and the laboratory data normal. The diagnosis of appendicitis had been made by an excellent voluntary hospital. The oscillating sign was negative. The child spent only two days in the hospital, and no operation was necessary.

CASE 5.—M. M., a white woman aged 19, was admitted to the hospital on Sept. 24, 1950. She had had repeated attacks of abdominal distress, with the pain localized to the right side and radiating into the right leg. She was just completing her menstrual period (fifth day). On the afternoon of the day of admission severe abdominal cramps developed, associated with continual retching and radiation of pain into the right lower abdominal quadrant and the right thigh. There was no urinary dysfunction. There was spasm over McBurney's point, with deep tenderness but no rebound. The oscillating sign was equivocal. The rectum was tender and showed fullness on the right side. There was no pain on movement of the cervix. The leukocyte count was 15,950 per cubic millimeter of blood, with 81 percent polymorphonuclears and 15 per cent lymphocytes. The urine was normal. The temperature was 100 F. The impression was that of acute appendicitis, with the possibility of ovarian cyst to be ruled out. Appendectomy was performed, and the patient had an uneventful convalescence. The pathologic diagnosis was chronic appendicitis.

Comment: This patient's history was indicative of acute appendicitis. Leukocytosis was present, and the polymorphonuclear leukocyte count was elevated. Only slight fever was present, and the oscillating sign was equivocal. Operation revealed chronic appendicitis.

CASE 6.—M. D., a white girl aged 12, was admitted to the hospital on Oct. 4, 1950. She had not yet menstruated, and there was no urinary dysfunction. Severe abdominal cramps had started four hours prior to admission, with nausea and continual vomiting. The pain radiated toward the right side, but there was no distinct localization. Spasm and tenderness were elicited over McBurney's point. The Rovsing sign was positive and the oscillating sign equivocal. The leukocyte count was 18,500 per cubic millimeter of blood, with 80 per cent polymorphonuclears and 18 per cent lymphocytes. The urine was normal. The temperature was 101.2 F. The impression was that of appendicitis. Appendectomy was performed, and convalescence was uneventful. The pathologic diagnosis was chronic appendicitis.

Comment: In this case the classic textbook picture of acute appendicitis was present. Fever and leukocytosis were observed, the urine was normal and the oscillating sign was equivocal. The actual condition present was chronic appendicitis.

CASE 7.—J. T., a white man aged 24, was admitted to the hospital on Aug. 30, 1950, with a history of abdominal cramps of twelve hours' duration, with nausea and slight vomiting. There were no abnormalities or complaints referable to the urinary tract. The patient was not in acute distress but complained of abdominal cramps. There was tenderness in the right lower abdominal quadrant, and muscle splinting was elicited over McBurney's point. No rebound tenderness was present. The oscillating sign was positive. Rectal examination revealed no abnormality. The leukocyte count was 14,600 per cubic millimeter of blood, with 88 per cent polymorphonuclears, 10 per cent lymphocytes and 2 per cent monocytes. The temperature was 100.4 F. The impression was that of acute appendicitis. Appendectomy was performed, and the patient had an uneventful convalescence. The pathologic diagnosis was acute suppurative appendicitis with periappendicitis.

Comment: Here both the history and the leukocytosis indicated acute appendicitis. Slight fever was also present.

CASE 8.—N. M., a white man aged 47, was admitted to the hospital on June 12, 1950. He complained of pain in the right lower abdominal quadrant, of twenty-four hours' duration, and accompanied with nausea and vomiting.

He had taken a soapsuds enema, without relief. Examination revealed tenderness in the right lower quadrant, with muscle splinting and rebound tenderness. Spasticity was present throughout the abdomen, but the pain was localized at McBurney's point. The oscillating sign was positive. The leukocyte count was 14,750 per cubic millimeter of blood, with 87 per cent polymorphonuclears. The urine was normal. The temperature was 101.3 F. The impression was that of acute appendicitis with perforation, with right peptic ulcer to be ruled out. Appendectomy was performed. The pathologic diagnosis was acute gangrenous appendicitis. The discharge note (August 2) reads as follows: ". . . ruptured appendix followed by self-inflicted S.S.E. enema and then by fecal peritonitis. Sedimentation rate is slightly elevated—12-13 mm. There is slight pretibial edema."

Comment: In this case the history, the leukocytosis and the temperature were all positive indications of appendicitis; this patient, however, already had localized peritonitis in addition. The oscillating sign was positive.

CASE 9.—L. A., a white man aged 20, was admitted to the hospital on Oct. 24, 1950, with para-umbilical cramps of forty hours' duration, followed by localization to the right lower quadrant. There was no diarrhea and no urinary dysfunction. There was tenderness in the right lower quadrant, with spasm over McBurney's point and a suggestion of the Rovsing sign. The oscillating sign was equivocal. The leukocyte count was 10,000 per cubic millimeter of blood, with 70 per cent polymorphonuclears and 24 per cent lymphocytes. The urine was normal. The temperature was 99 F. The impression was that of acute appendicitis. Appendectomy was performed, and convalescence was uneventful. The pathologic diagnosis was chronic appendicitis.

Comment: Here the history was typical of acute appendicitis. The leukocyte count was elevated and the oscillating sign equivocal. The actual condition present was chronic appendicitis.

CASE 10.—J. G., a white man aged 37, was admitted to the hospital on April 4, 1950, complaining of cramps of ten hours' duration in the right lower abdominal quadrant, with nausea but no vomiting. There was no urinary disturbance. Tenderness, direct and rebound, was elicited over McBurney's point, with spasm and muscle splinting in the same area The oscillating sign was positive. The leukocyte count was 10,550 per cubic millimeter of blood, with 83 per cent polymorphonuclears. The urine was normal. The impression was that of acute appendicitis. Appendectomy was performed. The patient's convalescence was uneventful. The pathologic diagnosis was acute suppurative appendicitis and periappendicitis.

Comment: In this, a typical case as to the leukocytosis and the abdominal picture, the oscillating sign was positive Acute appendicitis was the condition present.

These 10 patients showed varying degrees of leukocytosis on both total and differential counts. The histories vary too in their decline from the typical so-called surgical appendiceal history. In 1 case that of J. B., a previous diagnosis of acute surgical disease of the abdomen had been made. By careful abdominal palpation through relaxation of the abdominal muscles by the method described, no spasm and no muscle guarding could be detected The patient was discharged without operation and with the diagnosis of mesenteric adenitis. There is no doubt that the effectiveness or the fallibility of this technic is dependent upon the patience and experience of the examining physician or surgeon. However, all adjunct signs such as the psoas obturator, Rovsing etc. also vary with the disease and with the examining surgeon.

Obviously retrocecal, retroperitoneal and pelvic conditions producing little muscle splinting do not lend themselves well to diagnosis by this method.

So far as gallbladder disease, perforated peptic ulcer, and other abdominal pathologic conditions are concerned, this technic has been useful in differentiating the subjective and the objective part of the overlaying muscle spasm — nature's attempt to guard the injured organ or part beneath. When the trouble is on the left side of the abdomen the ex 's hand moves the knees to an examining hand is the right.

centration and practice it becomes evident that the subjective muscle guarding always relaxes. On the other hand, the active constant muscle spasm of the abdominal muscles reflexly stimulated by the injured organ beneath will remain resistant despite this to-and-fro motion of the legs.

The value of a good history, careful medical examination of the chest, and laboratory investigation is limitless. The method of abdominal palpation of the abdomen here described is offered only as an adjunct in the aid of diagnosis of surgical emergencies.

SUMMARY

A technic of relaxation of the abdominal muscles in spasm over an abdominal surgical emergency is advanced. No attempt is made to decry the value of laboratory data or normal aids to diagnosis. This method is offered as an adjunct or corroborative aid and not as a substitute for the good surgical diagnosis and technic that prevail in modern surgery.

RÉSUMÉ

L'auteur décrit un procédé de relâchement du spasme abdominal du ventre chirurgical. Ce procédé n'élimine pas les examens usuels de laboratoire mais sert d'adjuvant et de complément au diagnostic.

RESUMO

Uma técnica para relaxamente da musculatura abdominal nos casos de espasmos que se apresentam no abdomen agude cirúrgico é apresentada pelo autôr, adiantando êle tratar-se de um metodo auxiliar para corroborar com o diagnostico cirúrgico preciso.

ZUSAMMENFASSUNG

Es wird eine Technik zur Entspannung verkrampfter Bauchmuskeln in Fällen von akuten chirurgischen Bauchzuständen empfohlen. Dabei wird kein Versuch gemacht, den Wert von Laboratoriumsuntersuchungen oder sonstiger Seprobter diagnostischer Methoden herabzusetzen. Das Verfahren wird lediglich als ein zusätzliches oder bestätigendes Hilfsmittel und nicht etwa als ein Ersatz für die heute gültigen bewährten chirurgisch-diagnostichen Untersuchungsmethoden angeboten.

RESUMEN

Se da a conocer una técnica de relajación de los músculos abdominales contraídos durante una emergencia quirúrgica abdominal. No se intenta censurar el valor de los datos de laboratorio ó de los coadyuvantes usuales del diagnóstico. Se ofrece el método como un coadyuvante ó ayuda corroborativa y no como un substituto para el diagnóstico quirúrgico y la técnica que prevalecen en la cirugía actual.

RIASSUNTO

Viene proposto un metodo, di interesse chirurgico, capace di produrre il rilasciamento dei muscoli dell'addome in difesa durante uno stato patologico acuto dell'addome. Tale metodo non ha la pretesa di togliere valore ai dati di laboratorio o agli altri sussidi diagnostici in uso, ma vuole soltanto essere un'aggiunta ed un aiuto agli ottimi mezzi diagnostici e terapeutici in uso nella chirurgia attuale.

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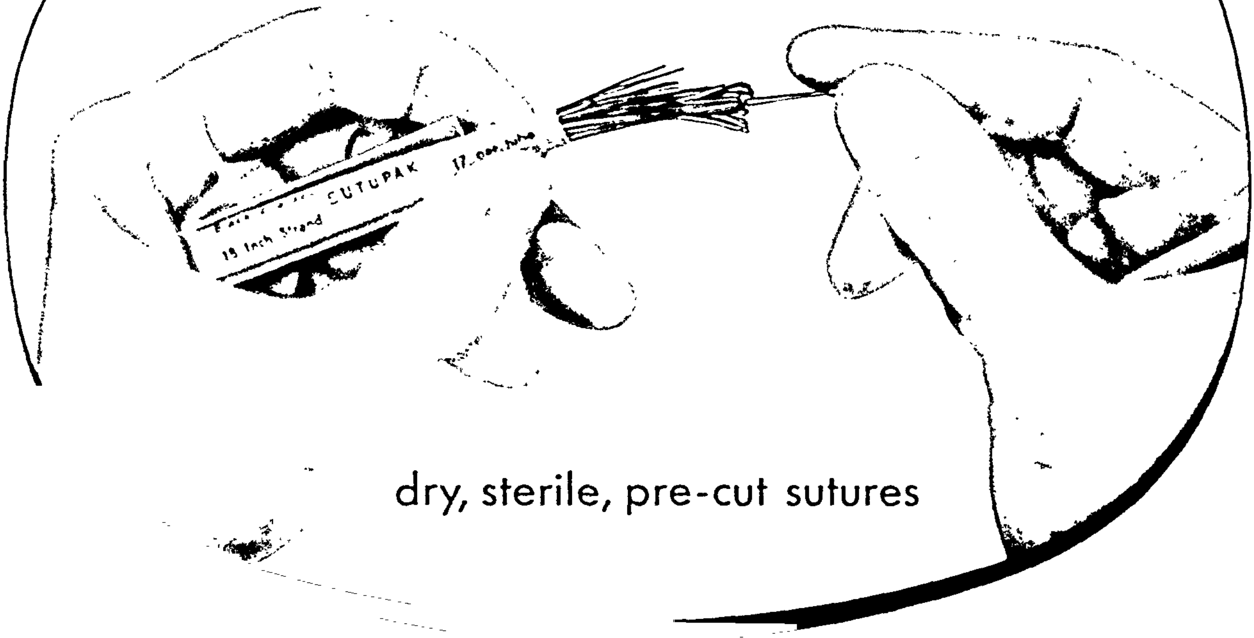

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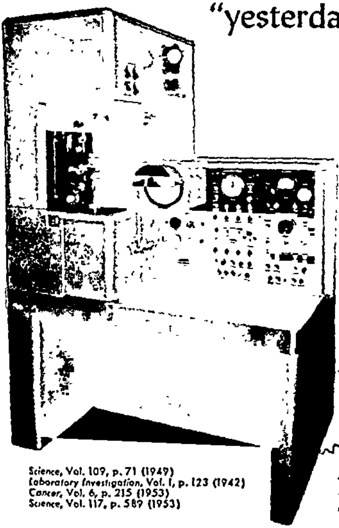

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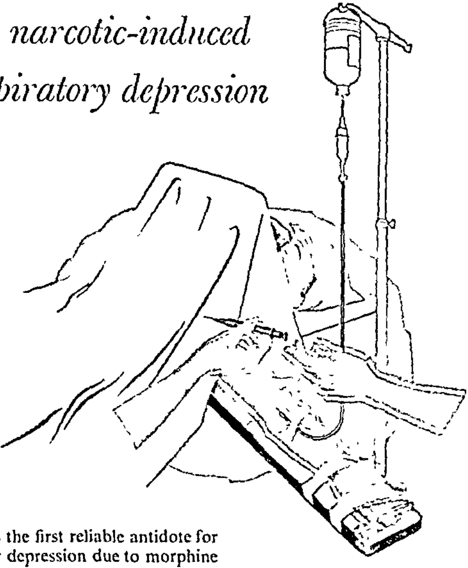

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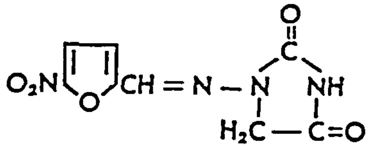

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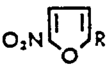

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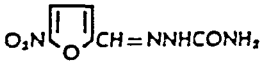

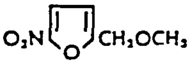

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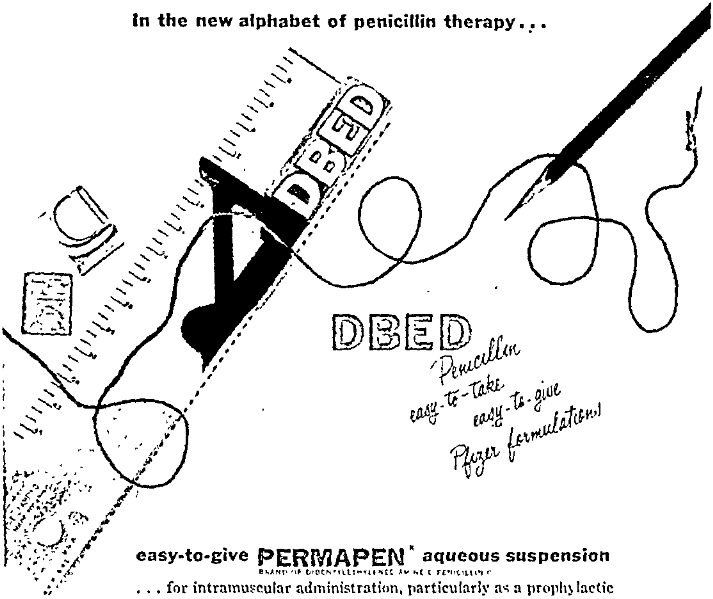

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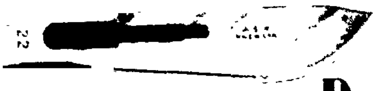

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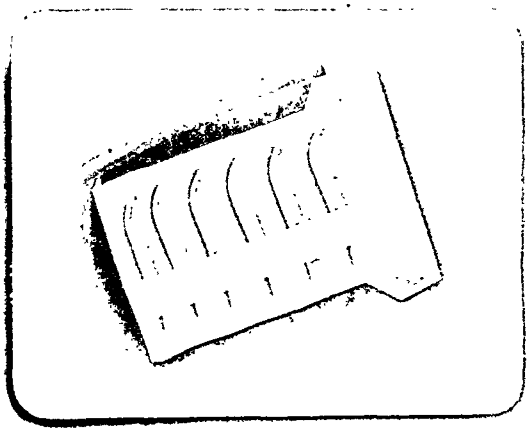

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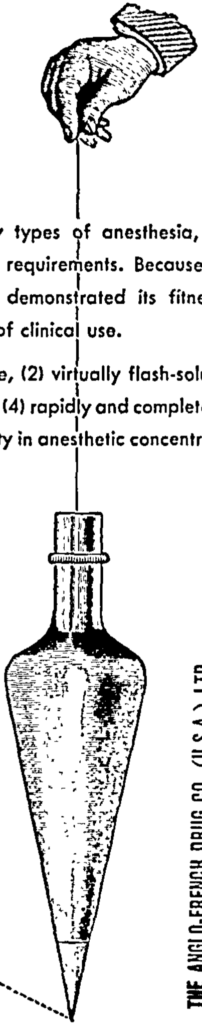

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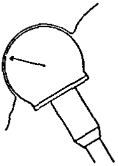

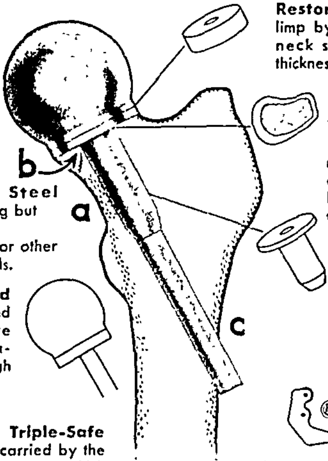

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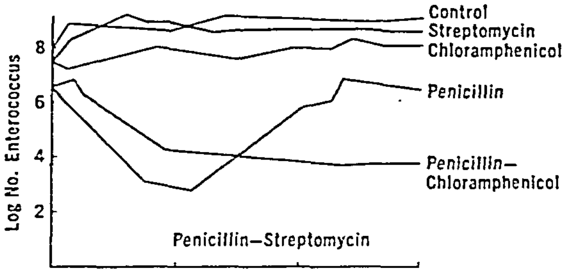

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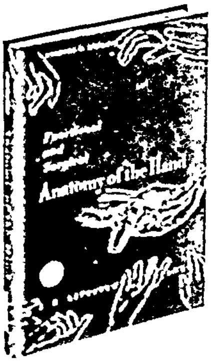

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Vol. XX OCTOBER, 1953 No. 4

Original Articles

Commissurotomy for Aortic Stenosis

C. P. BAILEY, M.D., F.A.C.S., F.I.C.S., H. E. BOLTON, M.D.,
W. L. JAMISON, M.D., AND H. B. LARZELERE, M.D.

PHILADELPHIA, PENNSYLVANIA

SINCE the first presentation of a feasible method of performing surgical commissurotomy for mitral stenosis in 1948[1] the possibility of performing a comparable separation of the fused commissures of other valves of the heart has been prominent in all of our considerations of possible correction of their stenotic states.

Commissurotomy by both digital and instrumental means was accomplished in rheumatic tricuspid stenosis as long ago as 1950.[2] The pulmonary valve is very rarely affected by the rheumatic process, and apparently seldom undergoes commissural fusion from any cause.

The aortic valve is commonly the site of rheumatic involvement, being second only to the mitral valve in frequency of such involvement. Progressive fusion of the valve commissures, beginning at the aortic wall, is characteristic of the subsequent stenotic lesion. It appears that this commissural fusion, which ultimately reduces the effective aortic aperture to a tiny triangular central opening, is characteristic of rheumatic aortic stenosis, never appearing in association with syphilitic aortitis and only rarely in patients with bacterial arteriosclerotic aortic valvular lesions. Congenital lesions of the aortic valve take the form either of a bicuspid valve, or of a megaphone-like aperture.

The principle of aortic instrumental

From the Division of Surgery, Department of Thoracic Surgery, Hahnemann Medical College and Hospital, Philadelphia, Pa., and the Bailey Thoracic Clinic, Philadelphia, Pa

Read at the European Meeting of the International College of Surgeons, *Rome, Italy, June 12, 1953.*

This work was supported by Donations from the National Council of Brith Sholom Women, and by the Thoracic Research Foundation.

Submitted for publication June 15, 1953.

commissurotomy was presented as early as 1950,[3] and an approach through the right common carotid artery (retrograde fashion) was described (Fig. 1). Unfortunately, both that instrument and that approach have since proved faulty. Both have subsequently been greatly modified.

On April 4, 1952, the modern aortic dilator* first became available to us. By that time a reasonably satisfactory transventricular approach had been developed (Fig. 2). The incorporation of the olive-tipped guide wire or finder has proved to be an invaluable addition to the instrument, obviating the otherwise considerable risk of producing a false passage through the back of the heart.

A description of the instrument and of our early experience in its employment by the transventricular route has been presented.[4]

The ability of the triangular dilating mechanism (triangular on cross section) to adjust automatically to the outline of the roughly triangular residual aortic orifice insures a proper alinement of each wedge-like dilating bar against its appropriate fused commissure. This is accomplished by incorporating a 360-degree swivel mechanism at the base of the triradiate dilating head. No sharp edge and no cutting mechanism is incorporated. We rely upon the natural tendency for one or more of the fused commissures to part upon application of splitting pressure by the mechanism (Fig. 3).

Thus a purely instrumental commissurotomy can be accomplished by transventricular passage without direct palpation of the valve or accurate visual or digital guidance of the commissurotomy instrument. The results of one year's ex-

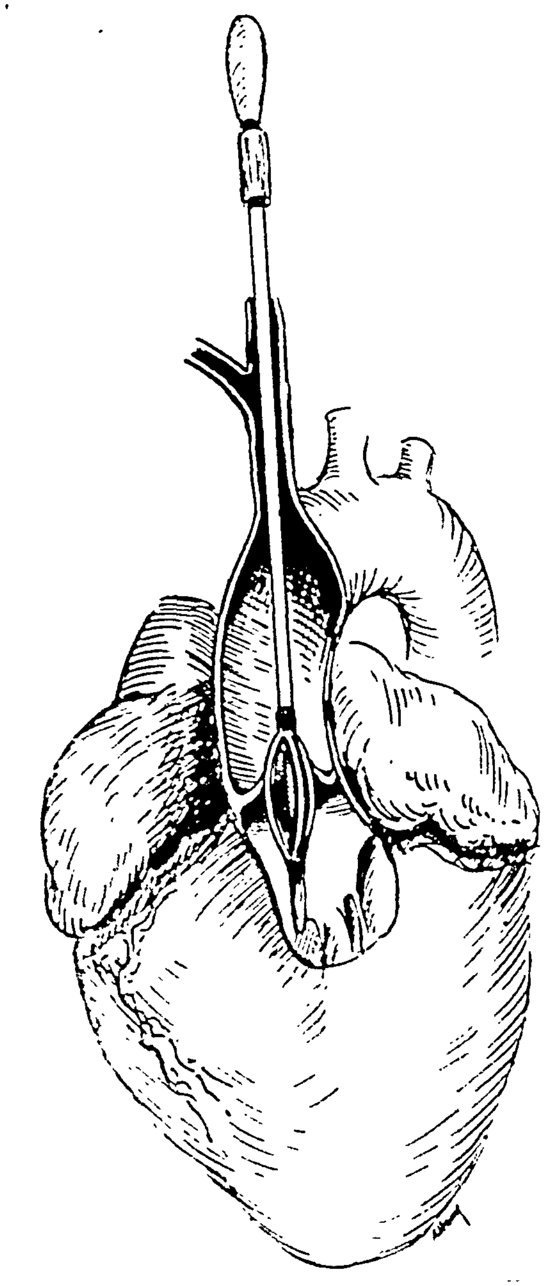
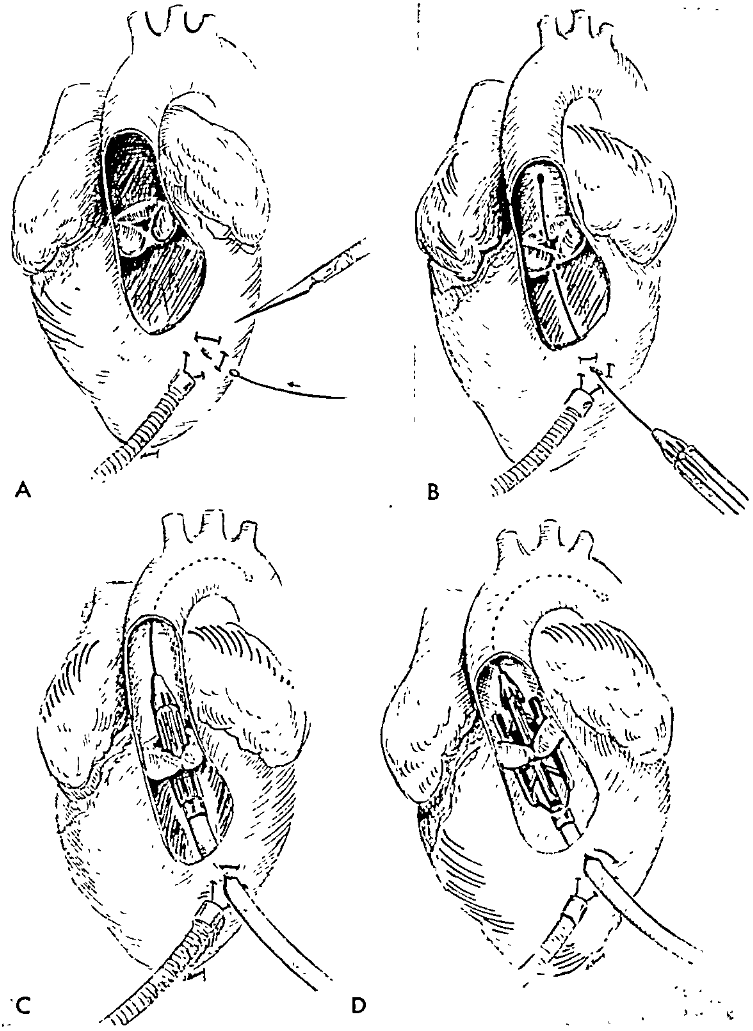


Fig. 1.—Schematic drawing of an early technic for retrograde approach to the aortic valve through the right common carotid for dilatation.

---

*Manufactured by J. S. Donaldson, Chatham, N. J. Available from G. P. Pilling & Sons, Inc., Philadelphia, Pa.

Fig. 2 (opposite).—*A*, transventricular approach to the aortic valve. The purse string is in position. The stab incision has been made, and the olive tip of the guide wire of the aortic dilator is to be inserted through the stab incision. *B*, guide wire advanced through the left ventricular outflow tract and through the valve and into the aorta. *C*, ventricular incision enlarged and dilator is advanced so that the dilating mechanism is within the aortic ring. The guide wire extends on around the aortic arch. *D*, triradiate bars of the aortic dilator expanded, separating the commissures of the aortic valve.


A
B
C
D

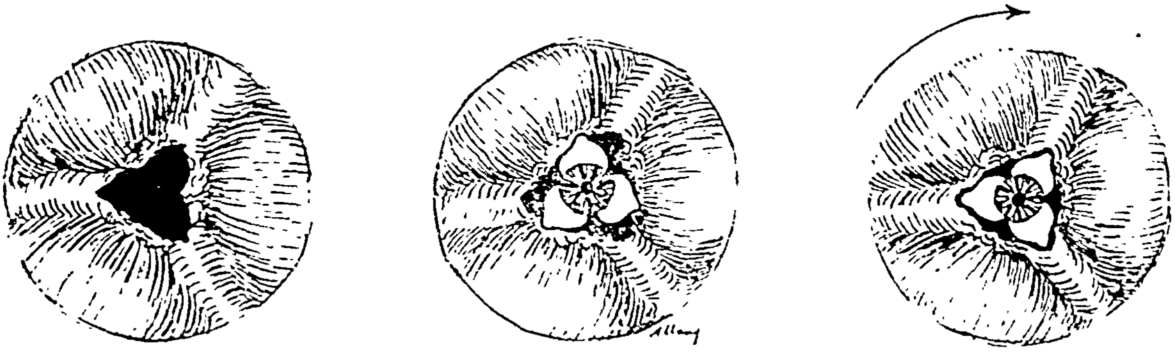


Fig. 3.—Schematic drawing of the usual configuration of the orifice of the aortic valve after fusion of the valvular commissures. The center drawing shows the aortic dilator within the orifice of the valve in cross-section. In the third drawing the swivel mechanism of the dilator allows the triradiate bars to conform to the rather triangular shape of the valve opening.

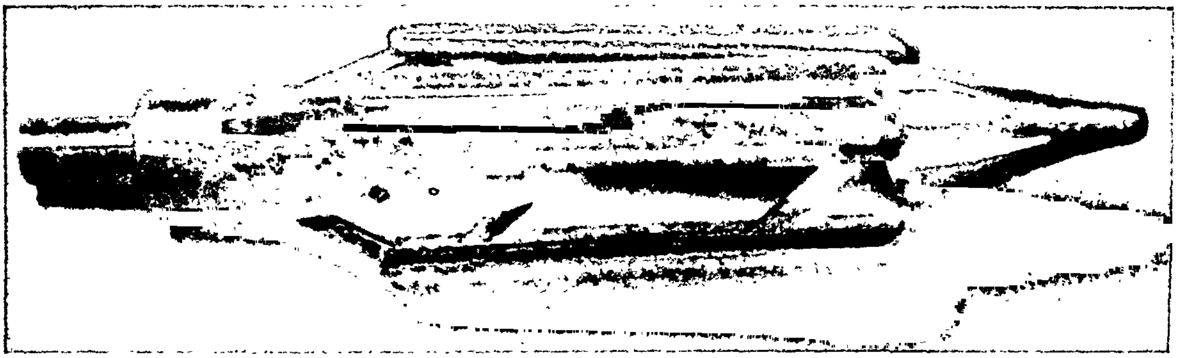


Fig. 4.—Photograph of the dilating mechanism of the aortic dilator, showing the expanded triradiate bars.

perience in the use of this instrument by this method are shown in Table 1.

The operative mortality rate remains relatively high, although it must be realized that these patients have often been very ill or even nearly moribund. In 48 per cent of the cases, coexisting lesions of the mitral valve have required simultaneous surgical treatment. Furthermore, this represents a pioneering or developmental project, a fact suggesting that further experience in selection, in management, and in improved operative technic may significantly reduce this mortality rate.

However, it is disturbing to note that the operative mortality rate in patients with only an aortic lesion is appreciably higher (20 per cent) than in those with coexistent mitral and aortic lesions and on whom both operations are performed simultaneously (11.9 per cent). These paradoxic results suggest that there may be a significant difference in the type, or perhaps an increase in the severity, of the aortic lesion in the univalvular case.

One would expect the megaphone type of congenital aortic stenosis, the bicuspid aortic valve, and the arteriosclerotic form of aortic stenosis to occur in the patient without rheumatic disease and hence in the patient without a mitral lesion. On the other hand, it is probable that the patient with both mitral and aortic disease will always be a sufferer from rheumatic disease, and hence will present commissural fusion of both valves. The similarity of the aortic lesion in the "combined case" to the isolated aortic lesion frequently seen suggests that in most cases the latter are also usually of rheumatic origin. At any rate, commissural fusion is a feature of them, suggesting the effectiveness of a commissurotomy.

Table 2, which shows the immediate causes of death in the various types of cases included in this series, clearly indicates that 9 of the 12 operative deaths were due either to early or late ventricular fibrillation or to hemorrhage from the site of ventricular punctures. Since these all seem *to be related to the approach by* the transventricular route, we have considered other possible routes.

There are other definite reasons for dissatisfaction with the operative technic as previously presented *(Figs. 5 and 7). Some* of these are related to the clinical results obtained in surviving patients. While follow-up shows that the vast majority (93.7 per cent) of surviving patients have been improved, 3 *(6.3 per cent) have apparent*ly received no evident surgical benefit. It is true that in each of these there was associated mitral disease and a simultaneous corrective operation was performed upon the mitral valve, so that it is difficult to be sure that the aortic commissurotomy was at fault. Yet in 1 of the patients (L. R.) who died in the early postoperative period there was no opening of any commissure. This observation suggests that it may be easy to fail to engage the instrument properly in the aortic orifice in the transventricular route.

In 8 cases (22.2 per cent) of the entire series, the preoperatively coexistent element of aortic regurgitation was either diminished or abolished by the aortic commissurotomy. In our opinion we believe that this phenomenon is due to

TABLE 1.—*Results of Simultaneous Mitral and Aortic Valvular Operations*

	No. of Cases	Early Death	Operative Mortality %	Late Death	Insufficiency Created or Increased
Univalvular (Aortic) Lesions					
Pure AS	18	3	20.0	0	3*
AS & AI	17	4	23.5	0	0
Total	35	7	20.0	0	3*
Multivalvular Lesions					
AS & MS	9	1	11.1	1	0
AS, AI, MS	9	0	0	0	0
AS, AI, MS, MI	15	3	20.0	1	1
AS & MI	3	1	33.3	0	0
AS, MS, MI	4	0	0	0	0
AS, AI, MI	2	0	0	0	0
Total	42	5	11.9	2	1
Grand Total	77	12	15.6	2	4

AI—Not dynamic

* 2 were cases of congenital aortic stenosis

TABLE 2.—*Causes of Death*

Lesions	Ventricular Fibrillation in Operating Room	Ventricular Fibrillation in Patient's Room	Hemorrhage in Operating Room	Hemorrhage in Patient's Room	Pulmonary Embolus	Left Ventricular Failure	Acute Right Ventricular Failure	Inc. AI Due to Operation	Surgical Trauma & Blood Loss
Univalvular Multivalvular									
Pure AS	2	1'							
AS & AI	1	1''		1					1
Multivalvular									
AS & MS			1			1*			
AS, AI, MS									
AS, AI, MS, MI			1		1		1	1**	
AS, MI		1'''							
AS, AI, MI									
AS, MS, MI									

*Late death—4 mo. p.o.

**Late death—4 weeks p.o.

'2 hr. p.o.

''½ hr. p.o.

''' 13 hr. p o.

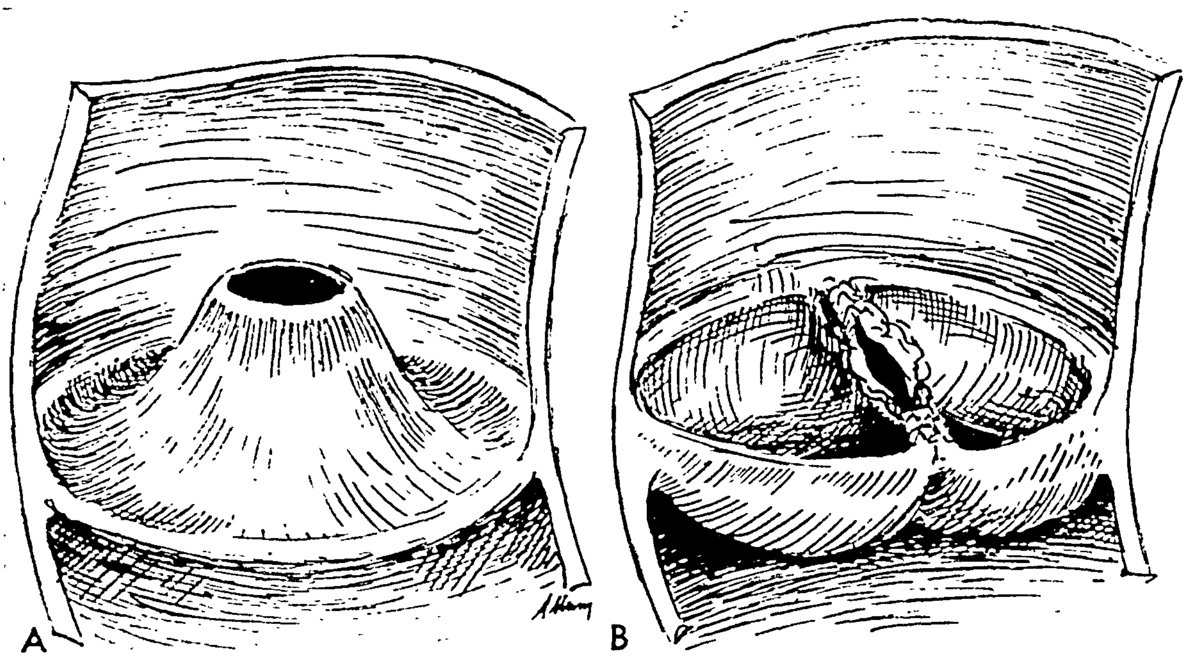


Fig. 5.—*A*, schematic drawing of the usual type of congenital aortic valvular stenosis; no commissures exist. *B*, congenital bicuspid aortic valve with superimposed rheumatic valvular disease along the edges of the cusps, resulting in stenosis.

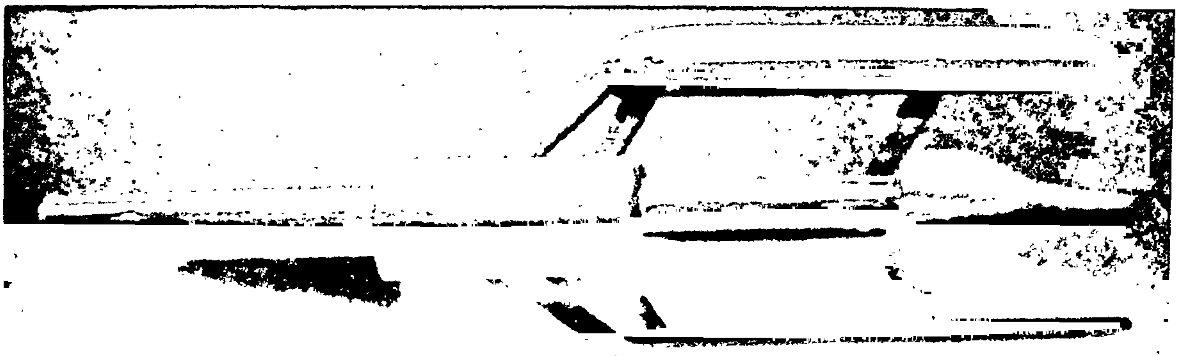


Fig. 6.—Interchangeable dilating head for the aortic dilator. This dilating mechanism has only two expandable bars which is more suitable for a congenital bicuspid stenotic valve.

fitting or coaptation of the mobilized aortic valve leaflets after their commissural separation. On the other hand, significant aortic regurgitation was first noted in P. P., and W. E. and in R. N., immediately after operation for apparently pure aortic stenosis; and in R. F., a preexisting aortic regurgitation was increased by the aortic surgical procedure.

These variations in clinical response to the transventricular procedure, the present overall relatively high surgical mortality rate (15.6 per cent) and certain theoretical objections to the present operation suggest the need for some modification in technic, especially for one that will permit digital exploration of the valve before and after, and preferably even during, the definitive surgical procedure.

After all, there is no reason to suppose that an instrument designed to produce trivalvular separation of the fused commissures would be especially suitable in a case of congenital aortic stenosis in which there never have been any commissures (Fig. 4). Nor would it be ideal in the case of aortic stenosis associated with a congenital bicuspid aortic valve (Fig. 5). If subsequent rheumatic commissural fusion should become superimposed upon such a congenitally bicuspid valve, our bi-radiate instrumental dilator head would seem to be indicated. (Fig. 6).

Similarly, one should expect little or no result in the extremely calcified valve in which all semblance of normal valvular anatomy has been destroyed and replaced by a great mass of calcium (Fig. 7). And in the peculiar form of arteriosclerotic disease in which the valve leaflets become hardened, but not thickened or deformed by calcium deposition, one can scarcely expect commissural separation, because there has been no commissural fusion (Fig. 8). Mechanical dilatation of the orifice is only momentarily effective, since the springy nature of the cusps restores the preoperative condition as soon as the instrument is removed.

The chief objections to the transventricular approach with our present instrument may be summarized as follows:

1. The necessary trauma to the incised left ventricular wall may cause serious weakening of cardiac function or may even produce ventricular fibrillation which in these cases is peculiarly difficult to overcome. This arrhythmia may occur immediately or not until some hours after the completion of the procedure, as in the cases of L. R. and E. S.—presumably as a result of the continued irritation of the myocardial sutures. The usually effective measures of cardiac resuscitation are seldom adequate for restoration of cardiac function in these cases, because the presence of the enormously thickened left ventricular wall in association with a very

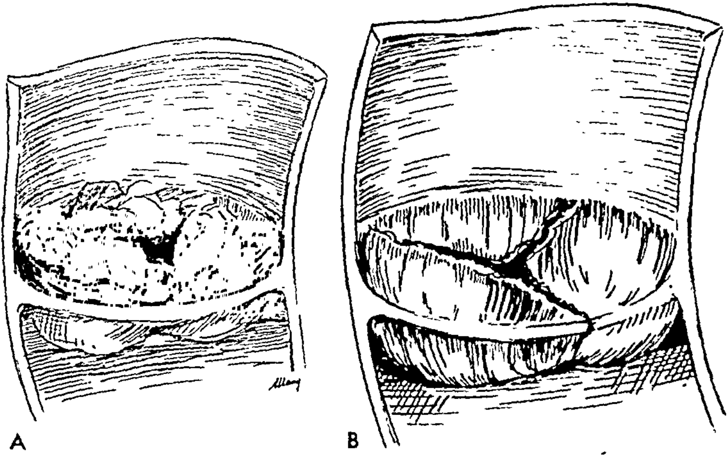


Fig. 7.—*A*, drawing to demonstrate the extreme calcification that may occur, destroying any resemblance to the normal configuration of the aortic valve. *B*, arteriosclerotic disease of the valve without fusion of the commissures, but with severe rigidity of the cusps. Separation of the commissures would not alter the rigid cusps.

small luminal chamber renders manual cardiac "massage" (rhythmic compression) very inefficient in establishing an effective cardiac output.

2. The extremely soft left ventricular myocardium, so commonly seen in cases of aortic stenosis, may not hold sutures securely. Two deaths, those of G. W. and D. R., were apparently due to this condition, the former dying on the operating table and the latter two and one-half hours later of ventricular hemorrhage.

3. The relatively long distance between the ventricular puncture and the aortic valve may permit inaccuracy in application of the dilating head so that it may be actually opened in the aorta above the valve, or below it within the left ventricular outflow tract. This was shown to have occurred in L. R. at autopsy. Possibly one or both of the 2 patients postoperatively unimproved may not actually have had a surgical separation of the commissures of the aortic valve.

4. The possibility exists of actually passing the entire dilating head through the valve into the aorta and then finding it to be "caught" above the closed valve (Fig. 9). Only at great risk to the integrity of the valve can it then be removed. The case of A. G. may actually have been an instance of such valvular damage, although she was subsequently appreciably improved clinically.

5. The considerable length of the guide wire used in the transventricular approach leads to certain technical difficulties related to the possibility of its entrance into the innominate, the carotid, or the left subclavian artery. Retraction of

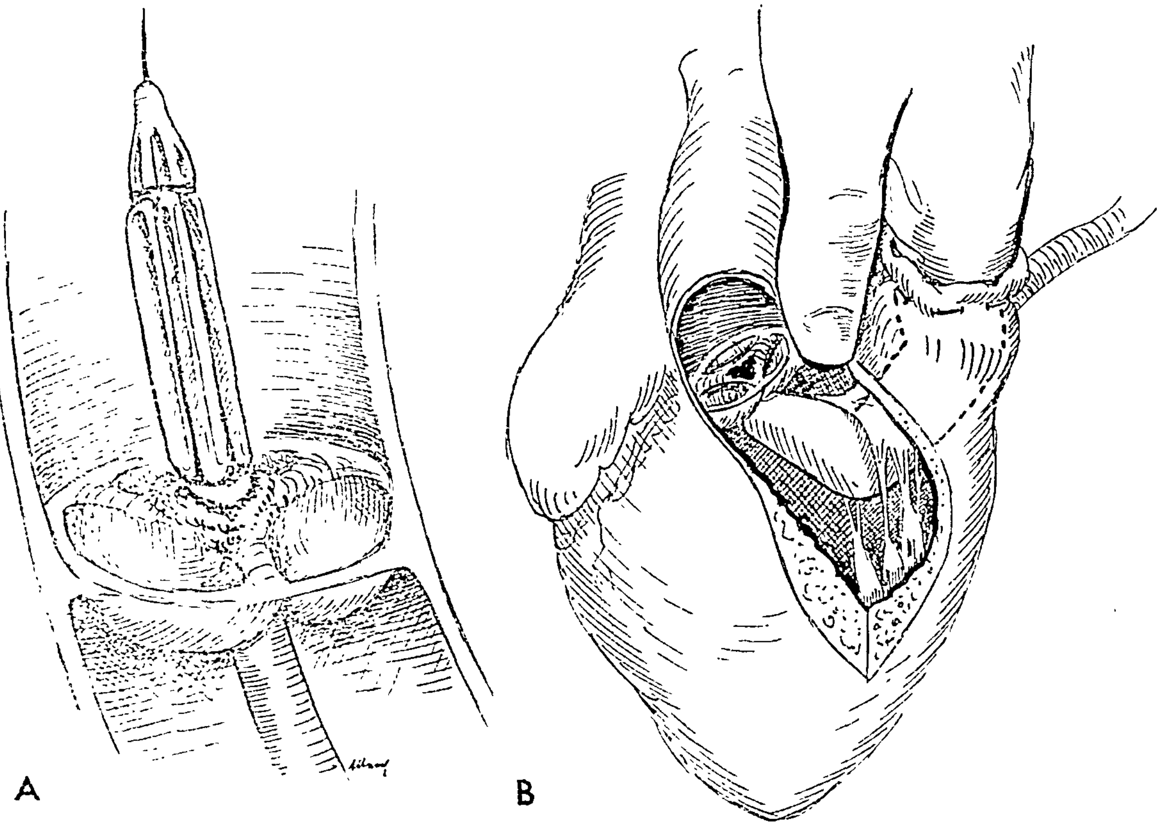


Fig. 8.—*A*, dilating mechanism of instrument has been passed completely through the aortic ring. Retraction of the dilating instrument back through the valvular orifice may cause injury to cusps. *B*, the Ramirez maneuver, showing the finger advanced through the left atrium through the mitral valve and beneath the septal-mitral leaflet to approach aortic valve for digital dilatation.

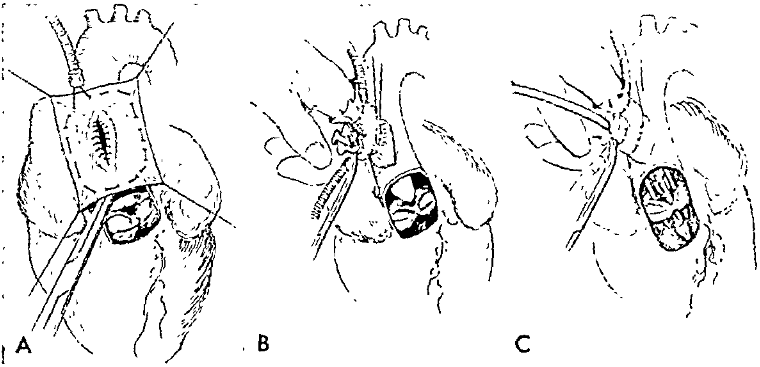


Fig. 9.—*A*, curved Potts clamp applied to the aorta for exclusion of a portion of the aorta for transaortic approach to the aortic valve. *A* portion of the pericardium has been sutured to the edges of the incision in the aorta with a peripherally placed purse-string which will be used as a pouch for insertion of the index finger. *B*, finger palpating the valve with hemostasis accomplished by the purse-string tightened about the index finger, and likewise a second purse-string in position for inserting the aortic dilator. *C*, aortic dilator advanced through the "pouch" and dilating the stenotic aortic valve under guidance with the left index finger. Bleeding controlled by the purse strings.

a portion of the wire by an assistant may be jerky and in one instance actually led to pulling it out of the valve orifice.

6. It has been found impossible during the past year, in 3 instances, to cause the guide wire, and hence the dilator head, to enter and pass through the diminutive and probably irregular valve orifice from the ventricular approach.

For these and other reasons, we have considered other possibly approaches to the aortic valve. As has been discussed previously,[3] the blind retrograde approach via the right common carotid and innominate arteries proved dangerous, owing to difficulty in finding the diminutive aortic valve orifice. Hence, the risk of creating a false passage must be considered inherent in this method.

Approach to the aortic valve via the left atrium and the mitral orifice has long seemed appealing. The Ramirez maneuver (Fig. 8B) has been described.[3] However, although the stenotic aortic valve was actually digitally dilated in 2 persons by this method, in a third patient operative death resulted from inadvertent tearing of the septal mitral leaflet. While it seems probable that an instrument capable of dilating the aortic valve could be designed which would pass first through the left atrium and the mitral orifice, such a method must always remain largely blind and presumably always risky.

After considerable mental and emotional consideration and prolonged experimental investigation, it was felt that an approach directly via an incision in the ascending portion of the aortic arch was both logical and reasonably safe. Accordingly, on March 3, 1953, a patient (R. C.) with both aortic stenosis and insufficiency was operated upon by a transaortic approach via a sternum-splitting incision. A strip of pericardium 2 by 3 inches (5 by 7.5 cm.) was sutured to the aortic arch about 1½ inches (3.7 cm.) above the valve level, producing an "aortic appendage." A pursestring suture of No. 2 braided silk was placed near its free extremity for hemostasis. A curved Potts' toothed clamp was applied to this portion of the aortic

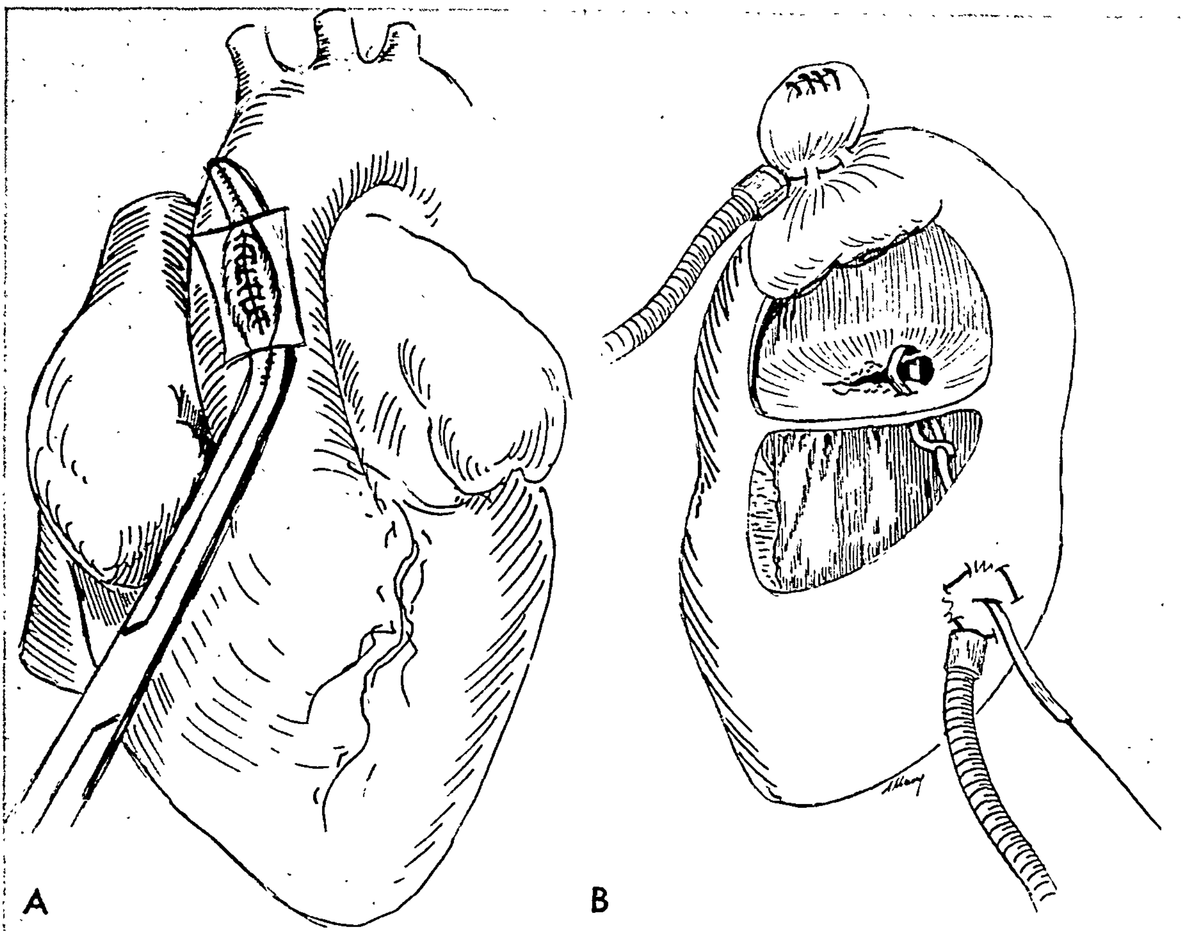


Fig. 10.—*A*, curved Potts clamp reapplied and incision in aorta sutured. A small portion of the pericardium is still attached to the incision line. *B*, narrow strip of pericardium used as a suture to approximate the edges of the mitral valvular leaflets for correction of concomitant mitral valvular insufficiency. The strip of pericardium protrudes from the wall of the left ventricle and is sutured in position when adjusted to the desired tension.

arch. The excluded aortic wall was longitudinally incised (Fig. 9A). The operating surgeon's left index finger was then inserted through this pericardial "appendage," through the incision in the aortic wall, and into its lumen. Hemostasis was maintained by tension on the pursestring about the "appendage."

The patient tolerated the maneuver well, and soon the surgeon was able cautiously to palpate the aortic valve, its leaflets, and its orifice (Fig. 9B). Some calcification existed, but there was considerable residual flexibility and evidence of symmetric commissural fusion of the cusps. The olivary tip of the instrument, advanced about 3 inches (7.5 cm.) from the dilator head, was cautiously passed along the finger until it penetrated the valve orifice. The finger was then rapidly withdrawn from the appendage and the aortic dilator head was simultaneously inserted until it, too, passed into the valve orifice. The dilator mechanism was widely expanded to accomplish the commissurotomy. It was then withdrawn.

The clamp was reapplied to the aortic arch, and the aortic wall was sutured by a row of mattress, and another of running, sutures of No. 4-0 arterial silk (Fig. 10A).

Since then we have modified this technic to permit the finger and the instrument to enter the aorta simultaneously. Thus the surgeon is able to feel the valve not only before and after instrumentation, but also actually during instrumentation (Fig. 10).

This approach to the stenotic aortic valve has been carried out 11 times, up to the time of this report. There have been 3 deaths in this series. All were related to excessive accumulation of sanguineous fluid in the mediastinum. It has seemed to the operating surgeon that the heart has tolerated the definitive maneuvers much better than the comparable ones performed from below. Excellent direct digital evaluation of the valvular pathologic picture has been possible in each instance. It has seemed that a more reliable and more adequate commissurotomy has been accomplished by this approach. However, the sternum-splitting incision is both time-consuming and attended by increased operative and prolonged postoperative blood loss.

At the suggestion of one of us (H. E. B.), a right anterior thoracic approach through the third intercostal space was tried and has proved both technically feasible and attended by relatively little trauma or blood loss. The aortic arch bulges toward the incision and is readily available for clamping, incising and subsequent suturing. Two patients have accordingly been operated upon by this approach with complete surgical satisfaction.

Through the efforts of Major J. S. Donaldson of Chatham, N. J., a plastic pouch with two finger-like projections has been devised to replace the pericardial pouch. The entire dilator head of the instrument is hemostatically contained within the longer finger-like projection, while the surgeon's ungloved left index finger is inserted through the other projection to palpate the valve before and after dilation and to guide the passage and action of the instrument.

An alternative retrograde approach to the aortic valve thus having been developed, the questions arise: "When, and in which cases, shall the retrograde approach be employed? Shall the transventricular approach be completely abandoned."

Obviously, the ideal indication for the transaortic approach is isolated "pure" aortic stenosis. Nondynamic associated aortic insufficiency, while a disadvantage, is not contraindicative. Not only can the possible lack of commissural fusion be detected by palpation, interdicting any attempt at commissurotomy in such cases, but the appropriate surgical treatment can, in suitable cases, be immediately and safely applied.

By the retrograde approach in these cases one obtains all the advantages of digital "visualization" of the great valve before, during and after the operation. And, in addition, the great risk of ventricular fibrillation and of ventricular hemorrhage are nearly completely abolished by avoiding incision into the irritable and degenerated left ventricular wall. However, the aortic wall may also be soft and friable in older patients. This would seem to contraindicate the transaortic approach.

What about cases in which there is associated mitral disease? Obviously one cannot approach both valves via the right third anterior interspace. And the mitral valve can only be approached with the greatest difficulty by way of a sternum-splitting incision.

Hence one must either plan to "stage" the surgical treatment of patients with bivalvular disease, preferably performing the aortic dilatation at the first stage, or else one must return to the original left posterolateral thoracic approach. This permits simultaneous surgical correction of the two valves.

In going over the results given in Table 1 for patients with both mitral and aortic stenosis simultaneously treated by operation, it becomes apparent that they present the lowest operative mortality rate of all (5.6 per cent). The reasons for this low rate must be significant. Let us consider.

In patients with essentially "pure" aortic stenosis of any significant degree of advancement, the left ventricular wall is tremendously thickened and hypertrophied. There is little or no dilatation, the ventricular chamber remaining small. The wall of the left ventricle is frequently very soft and "cheesy," so that properly applied sutures tend to cut through. This undoubtedly represents a form of myocardial degeneration, probably related to the prolonged isometric type of myocardial contraction caused by the aortic obstruction. Furthermore, such a hypertrophied ventricle frequently appears to be hyperirritable, manifesting runs of ventricular extrasystoles at the slightest stimulation.

Since there is relative coronary insufficiency in these cases because of the existence of the great myocardial muscle mass in the presence of a low intra-aortic pressure, one may consider that such a degenerated and relatively hypoxic myocardium is extremely predisposed to the development of ventricular fibrillation. It would seem that only an appropriate trigger mechanism such as would be afforded by incising or suturing the ventricular wall would be needed to precipitate such a fatal arrhythmia. Reference to Table 2 reveals that 5 of the deaths (71.4 per cent) in the cases of isolated aortic disease were so caused.

On the other hand, the heart with both aortic and mitral stenosis presents an entirely different appearance. The left ventricle is usually small, resembling that seen in the patient with pure mitral stenosis. The myocardium of the left ventricle is characteristically firm and healthy to the touch. Sutures hold well, and ventricular extrasystoles are infrequent during their application. It would seem that the associated mitral stenosis, by preventing complete filling of the left ventricle, had partially protected it against the effects of the aortic obstruction. It should come as no surprise that these ventricles do not readily fibrillate, even during the passage of the dilating mechanism and the performance of the definitive commissurotomy.

When serious mitral insufficiency coexists with aortic stenosis, the left ventricle becomes greatly dilated, but there is relatively less hypertrophy than in cases of isolated aortic disease. The left ventricle, although able to fill and able to empty readily its sanguineous content (even though largely into the atrium via the incompetent mitral valve), does not undergo the same type of degeneration observed in cases of isolated aortic stenosis. Hence it is much less irritable than in the latter type of case. However, 2 of the 4 patients who underwent simultaneous combined aortic commissurotomy and mitral suturing died (50 per cent). The mortality of mitral valve suturing alone in another series of over 70 cases has been approximately 25 per cent. It would seem that the mortality rate in combined cases might well be significantly reduced by performing the operations in stages. In our opinion the aortic valve should be operated upon first by the retrograde route. After several weeks, during which the right pulmonary expansion and function would be fully restored, the heart meanwhile profiting by the reduced work load and better coronary filling, the case should be reevaluated. Probably in a significant number of cases the mitral insufficiency would be found diminished, owing partly to reduction in the left intraventricular pressure and perhaps partly to less overstretching of the mitral annulus. It may be that in many such cases an additional mitral operation will not then be required. When a serious degree of mitral regurgitation persists, the appropriate surgical procedure may subsequently be carried out with an improved overall cardiac status to aid the patient in withstanding the strain of operation the expected postoperative depression.

SUMMARY AND CONCLUSIONS

The mortality rate for 18 patients with predominant mitral and aortic stenosis operated upon via the ventricular approach was 5.6 per cent. It may, accordingly, be better to continue to use the ventricular approach in patients with both aortic and mitral stenosis, since the operative incision (fifth left interspace) is suitable for surgical approach to both the mitral and the aortic valve. The authors are convinced, however, that the isolated aortic valve lesion is best approached in retrograde fashion vía the aortic arch and through a sternum-splitting incision.

This program will enable the surgeon to recognize congenital aortic stenosis and to advise only cautious and limited valvular separation, since such patients have no true commissures and hence are subject to free regurgitation if the valve orifice is widely torn or lacerated.

By the aortic approach one will recognize the bicuspid aortic valve and will be able to use the two-bladed dilator head.

In the arteriosclerotic form of the disease it will thus be possible to recognize the lack of commissural fusion and the futility of an attempt at commissural separation.

In the patient with combined mitral stenosis and aortic stenosis, the weight of probability will be toward rheumatic origin of the bivalvular lesion. The desirability of a simultaneous bivalvular surgical procedure will then probably indicate the more versatile left lateral thoracic approach. The approach to the aortic valve will then be the transventricular one.

In patients with both aortic stenosis and a mitral lesion that is preponderantly regurgitant, it will probably be best to attack only the aortic valve, using the aortic approach at the first operation. The mitral insufficiency may subsequently become less with the lowering of the intraventricular pressure so accomplished. If mitral regurgitation remains serious, a subsequent suturing of the mitral valve as previously described[6] may be undertaken (Fig. 15). The magnitude of this procedure strongly suggests the desirability of not combining it with surgical treatment of the aortic valve, which in itself involves an operation of some magnitude.

RESUMO E CONCLUSOES

Os autôres, renomadas técnicos em cirurgia cardio-vascular, apresentam em bem fundamentado trabalho as suas idéias atuais sôbre o tratamento cirúrgico das estenoses mitral e aortica, acentuando que, em 18 pacientes portadôres de tais lesões, e nos quais foi utilisada a via de acésse ventricular, foi registrada uma mortalidade aproximada de 5,6%.

Discutem a seguir as diferentes vias de acésso, selecionando—as conforme os casos, isto é, se a estenose é predominantemente mitral, ou se é isoladamente aortica, ou ainda se aféta, simultaneamente, as duas valvulas, aconselhando: 1) que se continue a usar a via ventricular no caso de pacientes com estenose mitro-aortica; 2) o emprego da via retrograda através o arco aortico. Acentuam que essa tática permitira ao cirurgião reconhecer serse trata de estenose congênita, aortica, e dessa maneira, orientar sua intrafenção no tocante a maneira de agir técnicamente.

Contiunam o seu trabalho, muito ilustrado, discutindo a etiologia das lesões valvulares, a forma das mesmas, a preponderancia, e, em relação a tais problêmas, a maneira de intervir em cada caso.

CONCLUSIONI RIASSUNTIVE

La mortalità operatoria su 18 pazienti affetti da stenosi mitrale e aortica e operati per via trans-ventricolare fu del 5,6%. E' quindi meglio continuare ad usare la via transventricolare nei pazienti con stenosi mitralica e aortica, dacchè l'incisione operatoria (5° spazio intercostale S) è adatta per dominare tanto la valvola aortica che la mitralica. Gli AA. sono, tuttavia, convinti che in caso di lesione aortica isolata sia meglio seguire il vecchio sistema passando attraverso l'arco aortico e mediante sternotomia.

Questo programma consentirà al chirurgo di riconoscere le stenosi aortiche congenite e di eseguire solo prudenti, e limi mitate sezioni della valvola dacchè pazienti non hanno connessure ver

prie a quindi vanno incontro alla insufficienza se l'orificio valvolare è troppo ampiamente lacerato.

Mediante la via aortica si potrà riconoscere la valvola aortica bicuspide e sarà consentito l'uso del dilatatore a due lame.

Sarà così possibile, nella forma arteriosclerotica dell'affezione, riconoscere la mancata fusione delle connessure e l'inutilità di procedere ad una sezione commissurale.

Nei pazienti che presentano tanto stenosi aortica che mitralica, l'origine di tale lesione bivalvolare è, con tutta probabilità, da far risalire al reumatismo articolare acuto. La necessità, allora, di intervenire in entrambe le valvole contemporaneamente renderà preferibile l'accesso da sinistra. L'aggressione, allora, alla valvola aortica sarà fatta per via transventricolare.

In pazienti che presentino tanto stenosi aortica che una lesione mitralica con prevalente insufficienza, sarà con ogni probabilità meglio aggredire solo la valvola aortica, usando, alla prima operazione, la via aortica. L'insufficienza mitralica, dato l'abbassamento della pressione intraventricolare così ottenuto, potrebbe di conseguenza diminuire. Qualora, invece, permanga una grave insufficienza mitralica si può procedere ad una successiva sutura della valvola mitralica, come già descritto (Fig. 15). La gravità di questa tecnica fà si che non sia consigliabile usarla in associazione alla cura chirurgica della valvole aortiche, intervento già di per se stesso abbastanza grave.

RÉSUMÈ

Le taux de la mortalité opératoire fut de 5.6% pour 18 patients souffrant de sténose mitrale et aortique. La voie ventriculaire servit d'approche; c'est elle que l'on recommande dans ces cas. Cependant, dans les cas de sténose aortique c'est encore l'incision du sternum que l'on recommande comme voie d'approche. Ce procédé permet au chirurgien de trouver les rétrécissements aortiques congénitaux et d'agir en conséquence. Cette voie permet aussi de reconnaître la forme artérioscléreuse de la maladie et d'éviter une séparation commissurale inutile.

Ches les patients avec une double sténose mitrale et aortique, on peut incriminer une origine rhumatismale. Dans ce cas, on se servira de la voie ventriculaire. Chez les mêmes patients ayant une sténose mitrale avec reflux, on doit d'abord opérer la valvule aortique, laissant au temps de remédier à la sténose mitrale. Cette intervention n'en est pas moins de grande envergure.

RESUMEN

El grado de mortalidad en 18 pacientes operados por vía ventricular, con estenosis mitral y aórtica fué de 5.6 por ciento. Consecuentemente puede que sea mejor continuar el uso de la vía ventricular en pacientes con estenosis mitral y aórtica, ya que la incisión operatoria (quinto espacio intercostal izquierdo) es una vía quirúrgica adecuada para ambas válvulas, mitral y aortica. Sin embargo, los autores tienen la convicción de que la lesión aórtica aislada se aborda mejor por la manera retrograda a través del arco aórtico y usando una incisión transesternal.

Este programa capacitará al cirujano, para el reconocimiento de la estenosis aórtica congénita, aconsejando unicamente separación valvular cuidadosa y limitada, ya que estos pacientes no tienen comisuras verdaderas y por ende estan sujetos a la regurgitación libre si el orificio valvular es desgarrado ó lacerado ampliamemte.

Por la vía aórtica se reconoce la válvula aórtica bicúspide y se puede usar la "hoja- espía con cabeza dilatadora."

En la variedad arterioesclerótica de la enfermedad es posible reconocer la ausencia de fusión comisural y la inutilidad de intentar una separación comisural.

En el paciente con estenosis mitral y aórtica combinadas, la probabilidad será hacia el origen reumático de la lesión bivalvular. El deseo de un procedimiento quirúrgico simultáneo indicará entonces

probablemente la mayor versatilidad de la vía lateral torácica izquierda. La vía para la válvula aórtica será entonces a través del ventrículo.

En pacientes con estenosis mitral y aórtica que es predominantemente regurgitante, probablemente será lo mejor atacar unicamente la válvula aórtica, usando la vía aórtica para la primera operación. Subsecuentemente la insuficiencia mitral será menor con la disminución de la presión intraventricular lograda. Si permanece regurgitacion mitral grave, puede ser llevada a cabo una sutura de la válvula mitral como se ha descrito previamente[6] (Fig. 15). La magnitud de este procedimiento sugiere fuertemente el deseo de no combinarlo con el tratamiento quirúrgico de la válvula aórtica, que en si mismo implica una operación de gran magnitud.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Unter 18 Kranken, die wegen vorwiegender Mitral- und Aortenklappenstenose auf dem Wege über den Ventrikel operiert wurden, betrug die Sterblichkeitsquote 5,6 Prozent. Demzufolge mag bei Kranken mit einer Stenose der Aortan-und Mitralklappen dem ventrikulären Zugangsweg weiterhin der Vorzug gegeben werden, da der Einschnitt (im linken fünften Rippenzwischenraum) sich als Zugang zu beiden Klappen eignet. Die Verfasser sind aber überzeugt, dass für die isolierte Aortenklappenerkrankung der retrograde Zugangsweg über den Aortenbogen mit Spaltung des Brustbeins der beste ist.

Die Vorschläge der Verfasser sollen dem Chirurgen die Möglichkeit geben eine angeborene Aortenstenose zu erkennen und sich mit eines vorsichtigen und begrenten Trennung der Klappen zu begrügen, da solche Kranke keine echten Kommissuren haben und infolgedessen einen unbehinderten Rückfluss erlaiden, wenn die Klappenöffnung weit aufgerissen oder zerfetzt ist.

Beim Zugang über die Aorta erkennt man die zweizipflige Aortenklappe und ist in der Lage, den zweischneidigen Dilatationskofp anzuwenden.

Bei der arteriosklerotischen Form der Erkrankung ist es möglich, das Fehlen der Verschmelzung der Kommissuren und somit die Aussichtslosigkeit des Versuches einer Kommissurentrennung zu erkennen.

Bei Kranken mit kombinierter Mitralaortenstenose überwiegt die Wahrscheinlichkeit rheumatischen Ursprungs der bivalvulären Erkrankung. In diesem Falle ist ein gleichzeitiger chirurgischer Eingriff an beiden Klappen erwünscht und infolgedessen der Zugang von der linken seitlichen Brustwand als der geschicktere Verfahren angezeigt. Der Zugang zur Aortenklappe erfolgt dann durch den Ventrikel.

Bei Kranken mit Aortenklappenstenose und gleichzeitigem regurgitierendem Mitralklappenfehler ist es wahrscheinlich am besten, nur die Aortenklappe anzugehen und sich bei der ersten Operation des Zuganges über die Aorta zu bedienen. Mit dem auf diese Weise erzielten Sinken des intraventrikulären Druckes kann in der Folge die Mitralinsuffizienz sich bessern. Bleibt ein erheblicher Rückstrom durch die Mitralklappe bestehen, so kann anschliessend eine Naht der Mitralklappe in der vorher beschriebenen Weise[6] ausgeführt wurden (Abb. 15). Die Schwere dieses Eingriffs lässt es als höchst wünschenswert erscheinen, ihn nicht mit der chirurgischen Behandlung der Aortenklappe, der selbst eine recht grosse Operation darstellt, zu kombinieren.

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Notice to All Members of the International College of Surgeons:

The House of Delegates on May 9, 1952, in Madrid, Spain, decided that the City of São Paulo would be the meeting place of the next International Congress, approving the suggestion of His Excellency the Governor of the State, Prof. Dr. Lucas Nogueira Garcez. Brazilian members of the Board of Trustees were appointed to the Commission organizing the Congress, under the direction of Prof. Dr. Carlos Gama, Vice-President of the International Congress and Secretary General for South America.

The Ninth International Congress will be held from April 26 to May 2, 1954. The official topics are (1) experience with socialized medicine in different countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the Fourth Centennial of the city of São Paulo, it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commemorative activities of São Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure that the program shall be absolutely functional, all who are interested are requested to write to the address below.

—Prof. Dr. Carlos Gama, Secretaria, Praca Ramos de Azevedo, 7.°
Andar, Sala 710, São Paulo, Brazil.

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Recent Trends in the Management of Tuberculosis of the Cervix

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THE cervix is one of the more uncommon sites of localization of tuberculosis in the female genital tract. Theoretically the disease may be primary or secondary, although proof of primary types is still disputable. The infection may result from direct extension or may be metastatic from distant foci by way of the blood stream or the lymphatics. The primary focus is usually in the pulmonary, gastrointestinal, or genital tract. The original lesion or lesions may or may not be of recent origin. Tuberculous salpingitis or salpingo-oophoritis, with or without involvement of endometrium, is usually associated with tuberculosis of the cervix. Cases have been reported in which evidence of acid-fast bacilli infection was observed in the peritoneum, the adnexae or the endometrium. As with tuberculosis elsewhere in the body, careful examination uncovers many lesions of tuberculous cervicitis that would otherwise go undiagnosed.

During the past three years the gynecology department of the Cook County Hospital has been interested in the role of streptomycin and para-amino in the treatment of gynecologic tuberculosis.[1] Of 55 patients in our present series, 9 have had tuberculous infections of the cervix. The lesions were limited to the cervix in 1 case and accompanied similar lesions elsewhere in the genital tract in the other 8. This incidence (16 per cent) is certainly higher than the 2 to 3 per cent reported in the literature, but is in accordance with the more recent observations and suggestions of Jameson.[2]

The symptoms associated with this type of infection depend on the degree of cervical involvement, the type and extent of noncervical tuberculous disease and the amount of secondary infection. Bloody discharge is the most prevalent symptom. Pain and noteworthy elevations in temperature are rarely marked, unless the other pelvic and abdominal viscera are involved. The most common initial diagnoses are chronic cervicitis, cervical erosion and carcinoma of the cervix. A differential workup should include: (1) cervical and endometrial biopsies with microscopic and bacteriologic (culture and guinea pig) studies whenever possible; (2) Papanicolaou smears; (3) stool cultures if diarrhea is present; (4) urine cultures if frequency nocturia or hematuria is present, and (5) pulmonary and gastrointestinal roentgenograms.

In 5 instances the patient's husband was available for genital examination and study. No evidence of tuberculosis was observed in any of the husbands.

REPORT OF CASES

CASE 1.—E. B., a Negress aged 29, para 2, with a history of 1 abortion, complained of prolonged menses, intermenstrual bleeding, chills before menses, intermittent pain the left lower abdominal quadrant, loss of weight and increased vaginal discharge. The temperature on admission was 100 F. Physical examination revealed fullness and slight doughiness in the lower part of the abdomen; the cervix was projected to within 1 inch (2.5 cm.) of the introitus, hypertrophic and irregularly lacerated, the portio studded with reddish granular

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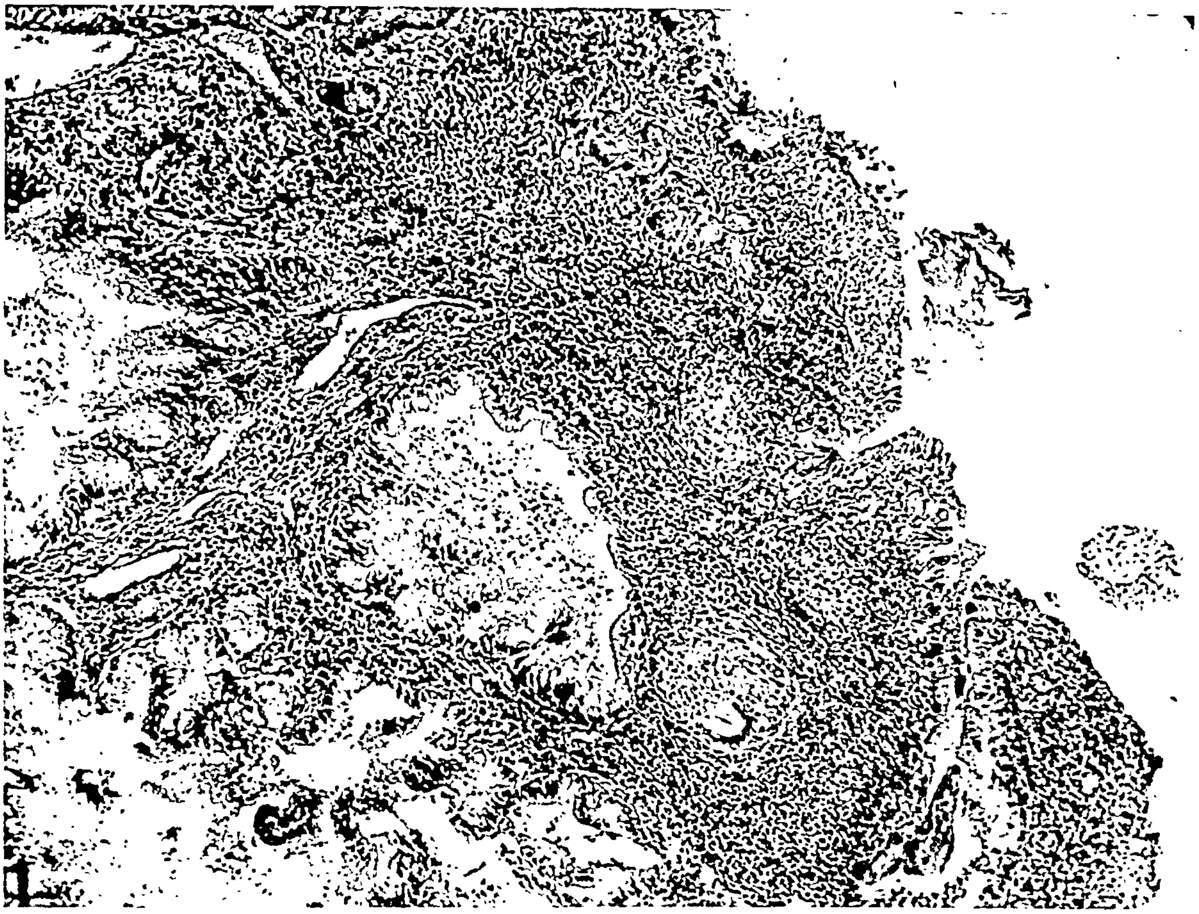

Fig. 1.—Portion of Cervix. Note columnar epithelium lining cervix. The cervical glands are lined with mucus-producing columnar epithelium.

tissue; the corpus was retrodisplaced, enlarged to the size of an orange, and surrounded by adnexae that were thickened, infiltrated, and not well outlined. *Cervical and endometrial biopsies gave positive results for tuberculosis.* After six weeks of streptomycin therapy a total hysterectomy and a bilateral salpingo-oophorectomy were performed. Streptomycin was given postoperatively for three weeks. The pathologic diagnosis was tuberculous salpingo-oophoritis, endometritis, lymphadenitis (pelvic gland) and cervicitis. Two and one-half years later this patient was alive and doing well.

CASE 2.—E. A., a 21-year-old Negress, gravida 1, para 2, complained of cessation of menses for two months, gradual loss of weight, discomfort in the lower part of the abdomen, inability to eat much, despite a good appetite, because of pain associated with ingestion of food, and increased vaginal discharge. Physical examination revealed the patient to be thin and acutely ill. The temperature was 101 F. The abdomen was rounded and doughy, with slight tenderness in the left lower quadrant. There was a purulent cheesy discharge. Fullness and tenderness of the cul de sac and fornices were noted, with no fluctuations; the corpus was elevated by adnexal masses extending into the cul de sac. The cervix was described as showing mild to moderate rawness. An endometrial biopsy gave positive results for tuberculosis, *but the cervical biopsy revealed only "chronic cervicitis"*. After eight weeks of streptomycin therapy, the patient had improved sufficiently to permit surgical intervention, i.e., total hysterectomy, bilateral salpingo-oophorectomy and resection of one of many large mesenteric lymph glands. The microscopic report read "Tuberculosis of endometrium and myometrium; tuberculous salpingo-oophoritis; *tuberculous cervicitis,* and caseating necrosis of a lymph gland." Streptomycin was given postoperatively for three weeks. This patient died one year later of tuberculous meningitis which failed to respond to streptomycin.

CASE 3.—F. H., 26-year-old Negress, a nulligravida, was admitted to a surgical ward because of a mammary abscess. Incision and drainage were done; the pathologist reported tuberculous granulation tissue. Further questioning revealed the presence of increased vaginal discharge for one year and amenorrhea for two months. The corpus was of normal size, shape and position. The right adnexae were thickened, infiltrated and fixed, while the left adnexae formed a mass the size of a lemon. Speculum examination showed several small areas of "erosion". Endometrial biopsy gave positive results for tuberculosis, while the *cervical biopsy specimen was reported as showing "chronic cervicitis."* After eight weeks of streptomycin therapy the patient's breast was healed; total hysterectomy and bilateral salpingo-oophorectomy were done. The microscopic report read, "Tuberculous endosalpingitis associated with tuberculous endometritis and *tuberculous cervicitis*." The patient was given streptomycin for three weeks after the operation. Two years later she was in good condition, and no complications have been noted up to the time of writing.

CASE 4.—E. S., 25-year-old Negress, entered the Cook County Hospital complaining of irregularity of the menses, spotting between periods, increased vaginal discharge, discomfort in the lower part of the abdomen, dyspareunia, chills and fever, but no loss of weight and no night sweats. Physical examinations revealed: slight distention of the lower part of the abdomen with some tenderness in the left lower quadrant; the cervix projected forward, enlarged and firm, with some pain on motion; the corpus was of normal size, retrodisplaced with motility, deviated to the left; the adnexae were bilaterally thickened, moderately tender and fixed, more so on

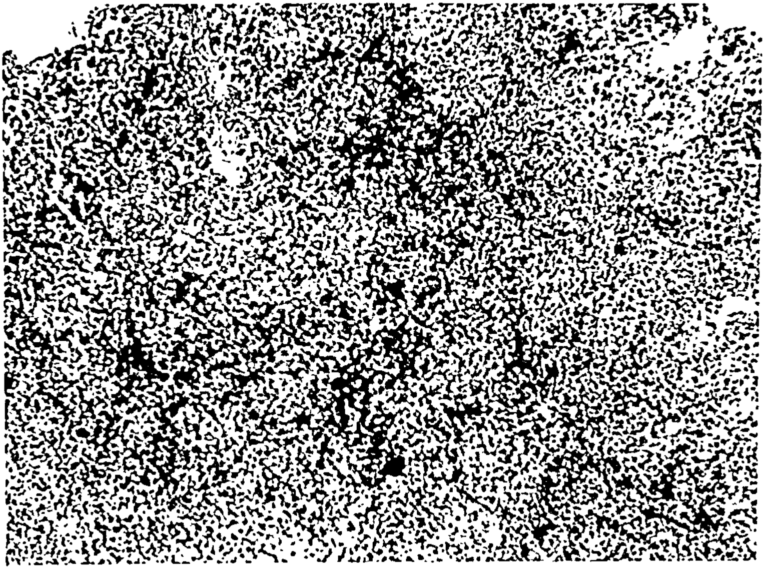

Fig. 2 (H. P.).—Area of coagulation necrosis in center giant cells. Epithelioid cells around area of necrosis. Lymphocytic infiltration at periphery.

the left; speculum examination showed a raw, angry red granulating lesion of the cervix. *Cervical and endometrial biopsies gave positive results for tuberculosis.* After eight weeks of streptomycin therapy the cervix was described as "about normal in size, still beefy red, but with little evidence of previous granular appearance, does not bleed easily." A total hysterectomy and a bilateral salpingo-oophorectomy were then performed. The microscopic report read as follows: "Section of cervix reveals hyperplastic tuberculosis of cervix. Sections of tubes, ovaries, and *uterus show no abnormal changes.*" Streptomycin was given postoperatively for three weeks. One and one-half years later the patient was in good condition.

CASE 5.—M. M., a 40-year-old Negress, gravida 2, para 0, was admitted to the gynecologic surgery department because of pain in the lower part of the abdomen, nausea and vomiting, vaginal discharge which at first was mucopurulent and later bloody, and absence of menstruation during the past two months. The vaginal vault was deep and distensible; the cervix was posterior, enlarged, firm and freely movable, and bled easily. The corpus was of normal size, shape and position; the adnexae were thickened, infiltrated and tender. Speculum examination showed an enlarged ragged-looking cervix, granular and bleeding on the slightest trauma. The diagnosis on admission was carcinoma of the cervix. *Cervical biopsy gave positive results for tuberculosis.* There was not sufficient endometrial tissue for study. Papanicolaou smears repeatedly gave negative results. After 40 days of streptomycin therapy there developed complaints referable to the eighth nerve and generalized itching. The drug was stopped for one week, then restarted at half the original dose of 1 Gm. per day, with no further complaints.

At this time speculum examination showed "angry, red, hypertrophic though smaller cervix, with mouse-bitten appearance." The pelvic abnormalities were minimal — thickening

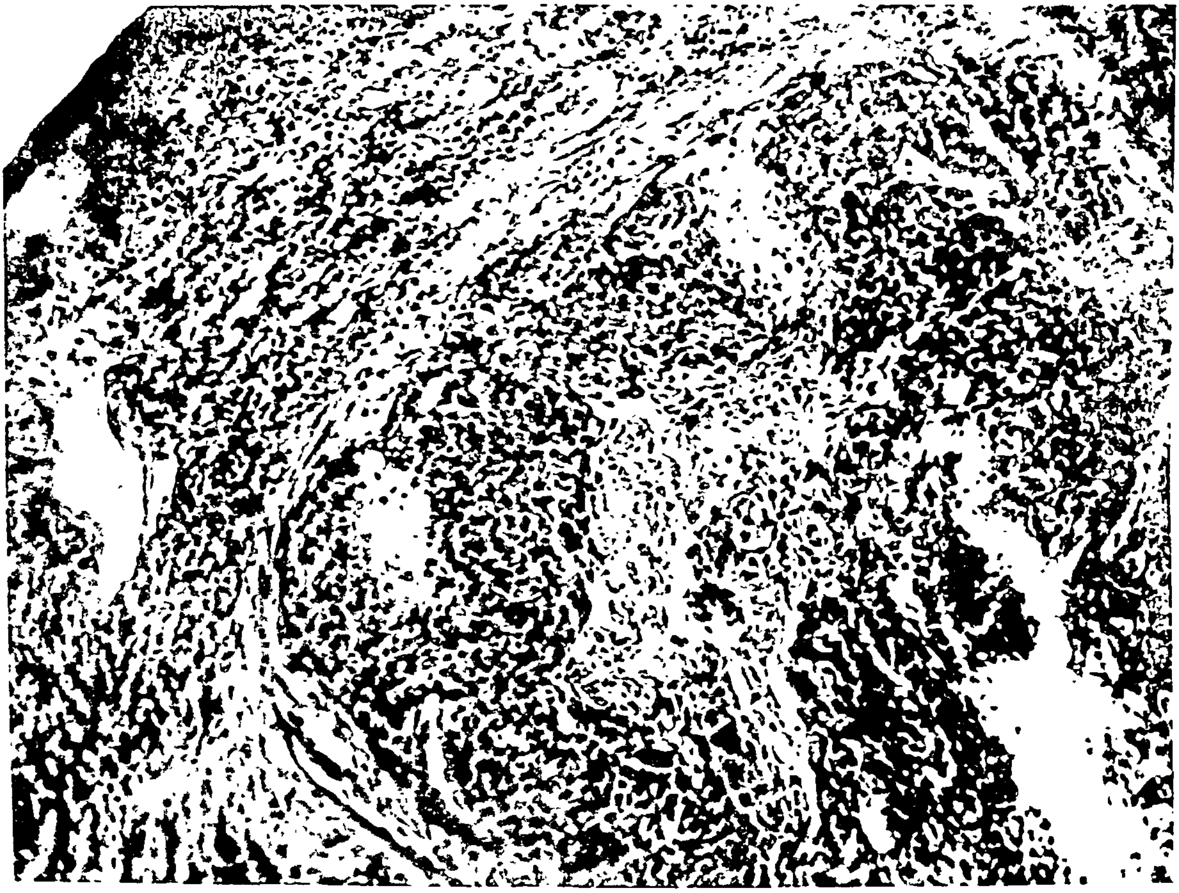

Fig. 3.—Small giant cells, epithelioid cells.

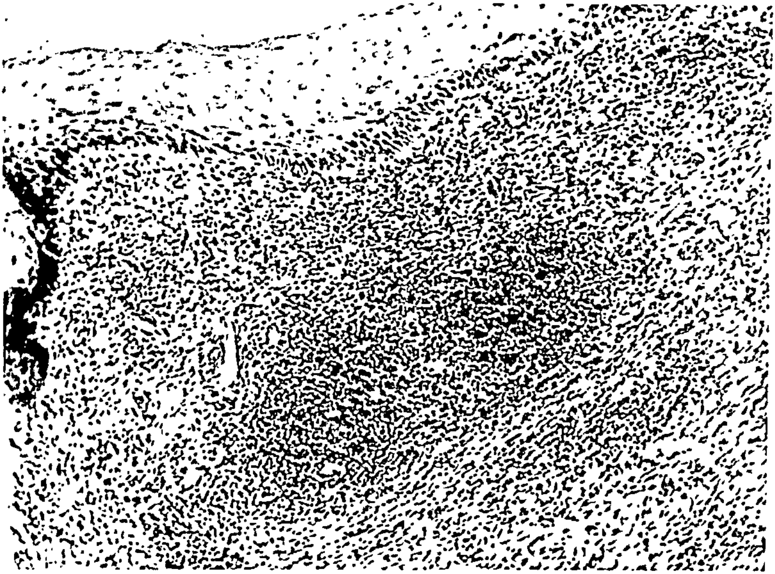

Fig. 4.—Stratified squamous epithelium of cervix; lymph follicle in center surrounded by light-staining epithelioid cells and lymphocytes. (Lymph follicle reaction adjacent to tuberculous infection.)

and infiltration of the adnexae. Repeat cervical biopsies gave positive results for tuberculosis. After one hundred and twenty days of streptomycin therapy the cervix was noted to be free of its previous granular appearance; it did not bleed easily; the portio was smooth and clean, the discharge was mucoid and slight, and the adnexae remained unchanged. One month after the patient's discharge from the hospital she felt well and had no complaints. Thus far the menses had not returned. Because of her remarkable improvement and minimal gynecologic abnormalities, surgical intervention was not advised. The patient is being closely followed in our clinic, with periodic pelvic examinations, cervical smears for culture purposes, and endometrial biopsies for bacteriologic and microscopic studies.

Case 6.—L. H., 32-year-old Negress aged 32, gravida 2, para 0, entered the Cook County Hospital complaining of pain in the lower part of the abdomen for one year, progressive abdominal distention, weakness, dizziness and occasional diarrhea. The positive temperature was 102 F. The abdomen was distended and somewhat tympanitic, with a suggestion of a fluid wave. The corpus and adnexae were bound together and not well outlined. Speculum examination showed a hypertrophic cervix on which was superimposed a cauliflower-like growth. The cervix projected forward and bled easily on being wiped with cotton. *Cervical biopsy gave positive results for tuberculosis.* Papanicolaou smears were negative. After forty days of streptomycin therapy the patient gained 6 pounds (2.7 Kg.). She had long since been afebrile. The uterus and adnexae were more easily outlined and identifiable. Speculum examination showed a cervix "still eroded and hypertrophic; the anterior lip is inverted and contains papillary-like excresences." After sixty days of streptomycin therapy she had gained a total of 10 pounds (4.5 Kg.) and continued to be afebrile. There was notable absence of abdominal distention, though the doughiness persisted; there was no abdominal pain, though some tenderness could be elicited on bimanual examination of the persistently thickened and infiltrated adnexae. The cervix remained "reddened, raw, hypertrophic and easily bleeding." The vaginal discharge was abundant. After one hundred and twenty days of treatment with streptomycin and two months of para-aminosalicylic acid therapy the cervical picture improved remarkably, but the adnexae on both sides remained thickened and infiltrated, while the corpus was deviated to the left, fixed, and minimally tender on palpation. A total hysterectomy and a bilateral salpingo-oophorectomy were done. The pathologic report was as follows: "Tuberculous salpingitis and oophoritis. The ovaries reveal several follicular cysts, one containing blood and tuberculous granulation tissue replacing much of the normal tissue. *There is no evidence of tuberculosis of the cervix.*" Six months later the patient continued to do well.

CASE 7.—H. G., a 56-year-old white nullipara, was admitted to the medical service of the Cook County Hospital because of dyspnea, chills and fever, a blood-tinged vaginal discharge and irregular menses. Physical examination revealed moist rales at both lung bases, cardiac arrythmia, and a liver 2 fingerbreadths below the costal margin. The cervix was firm; it pointed upward, and some pain was elicited on motion. The corpus was retrodisplaced, questionably enlarged, limited in mobility and deviated to the right. The adnexae on each side were thickened, infiltrated and fixed. Speculum examination revealed the cervix to be reddish and slightly granular; it bled easily on wiping. The clinical diagnosis was (1) auricular fibrillation; (2) chronic pelvic inflammatory disease, and (3) carcinoma of the cervix. *A cervical biopsy revealed tuberculous endocervicitis.* Streptomycin and para-aminosalicylic acid were started, and the patient was transferred to the gynecologic service as soon as the heart compensated.

After four weeks of para-aminosalicylic acid therapy, she became severely nauseated and began to vomit. This drug was stopped, but the streptomycin therapy was continued. Endometrial biopsy specimens were then taken and revealed tuberculous endometritis. Vaginal smears and vaginal cultures gave negative results for acid-fast organisms. After twelve weeks of streptomycin therapy the patient had gained considerable weight (12 pounds, or 5.4 Kg.). She felt a great deal better and had a minimal mucoid vaginal discharge. At this time, against our advice, she left the hospital. The last pelvic examination revealed a retrodisplaced uterus, deviated to the right and with limited mobility. The adnexae were non-tender and thickened. Speculum examination showed the posterior cervical lip to be clear and pinkish red, but the anterior lip was still red and bled easily. This patient has not returned for follow-up studies, despite repeated correspondence.

CASE 8.—J. B. a 62-year-old negress, gravida 4, para 2, entered the Cook County Hospital complaining of vaginal bleeding for two days. Her last menstrual period had occurred ten years earlier. Pelvic examination revealed a friable cervix, with a necrotic crater that bled easily; the corpus, though small was in normal position; the adnexae were not noteworthy; and the parametria were thought to be somewhat infiltrated on both sides. The clinical impression at that time was Stage II carcinoma of the cervix. Dilation and curettage were done, and radium therapy was started. *Microscopic studies, however, revealed tuberculosis of the cervix* and *tuberculous endometritis.* Total hysterectomy and bilateral salpingo-oophorectomy were done before antibiotic therapy could be started.

CASE 9.—S. P., a 25-year-old negress, a nullipara, was admitted to gynecologic service complaining of swelling of the abdomen, intermittent discomfort in the lower part of the abdomen, occasional night sweats, postprandial pain, an increased whitish vaginal discharge and weakness. The abdomen was markedly distended and tympanitic, and questionable masses were palpable in the lower quadrants. The cervix was firm; it pointed anteriorly and had limited mobility. The corpus was within normal limits but deviated to the right. Both adnexae were thickened, fixed and not well outlined. Indefinite doughy masses seemed to incorporate the adnexae and the corpus. Speculum examination revealed the portio vaginalis to be speckled by granulation-like tissue. The clinical impression at that time was (1) tuberculous adnexitis and peritonitis and (2) possible tuberculous cervicitis. *The cervical biopsy revealed tuberculous endocervicitis;* endometrial biopsy as well as the vaginal culture and smears gave negative results for acid-fast organisms. After twelve weeks of streptomycin and two and one-fourth

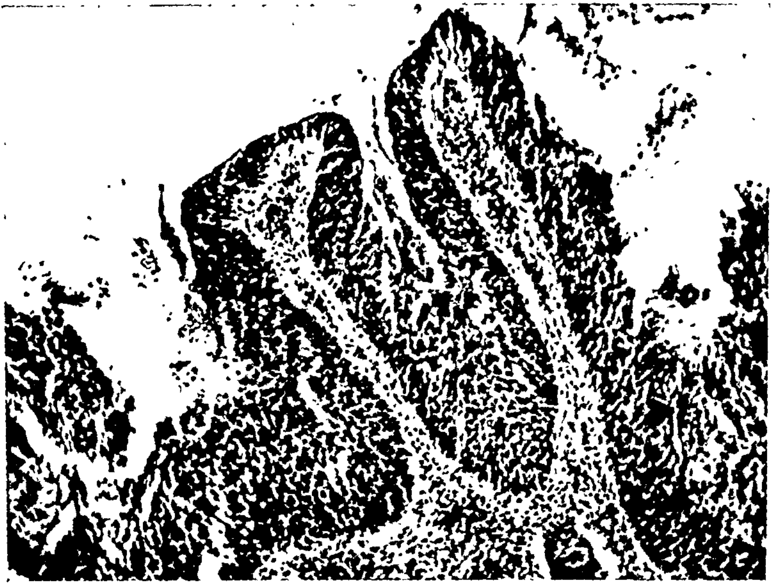

Fig. 5.—Cervical glands lined with mucus-producing columnar epithelium. Non-specific inflammation in upper portion.

months of para-aminosalicylic acid, bilateral tubo-ovarian masses were still palpable, though the cervix appeared smooth and clean. Total hysterectomy and bilateral salpingo-oophorectomy were done. The microscopic report was (1) caseous tuberculosis of the ovary; (2) chronic endocervicitis, (3) no evidence of tuberculosis in the myometrium or endometrium, and (4) tuberculous endosalpingitis. The patient was given streptomycin and para-aminosalicylic acid postoperatively for three weeks. At the time of writing, three months after the operation, she is doing well.

Treatment.—Since the initial reports on tuberculosis of the cervix by Raymond (1831) and Lisfranc (1842),[3] there has been a marked diversity of opinion as to the ideal method or methods of treatment. Among the procedures recommended to us have been the application of caustics, cauterization, electrocoagulation, amputation, conization, ultra-violet light, roentgen therapy, and hysterectomy.

Treatment of tuberculosis of the cervix depends on the type and extent of the cervical lesion, the presence and extent of tuberculous involvement of other genital organs and/or abdominal viscera, and the clinical response of the patient to the use of streptomycin, para-aminosalicylic acid and INH. Once the diagnosis of tuberculosis is established, the drugs can be started. Our policy has been to give 1 Gm. of streptomycin in a single dose daily for at least eight weeks, and then to reevaluate the patient. A careful survey of the genital organs is made in order to establish the extent of invasion of the uterus, adnexae, vagina or vulva.

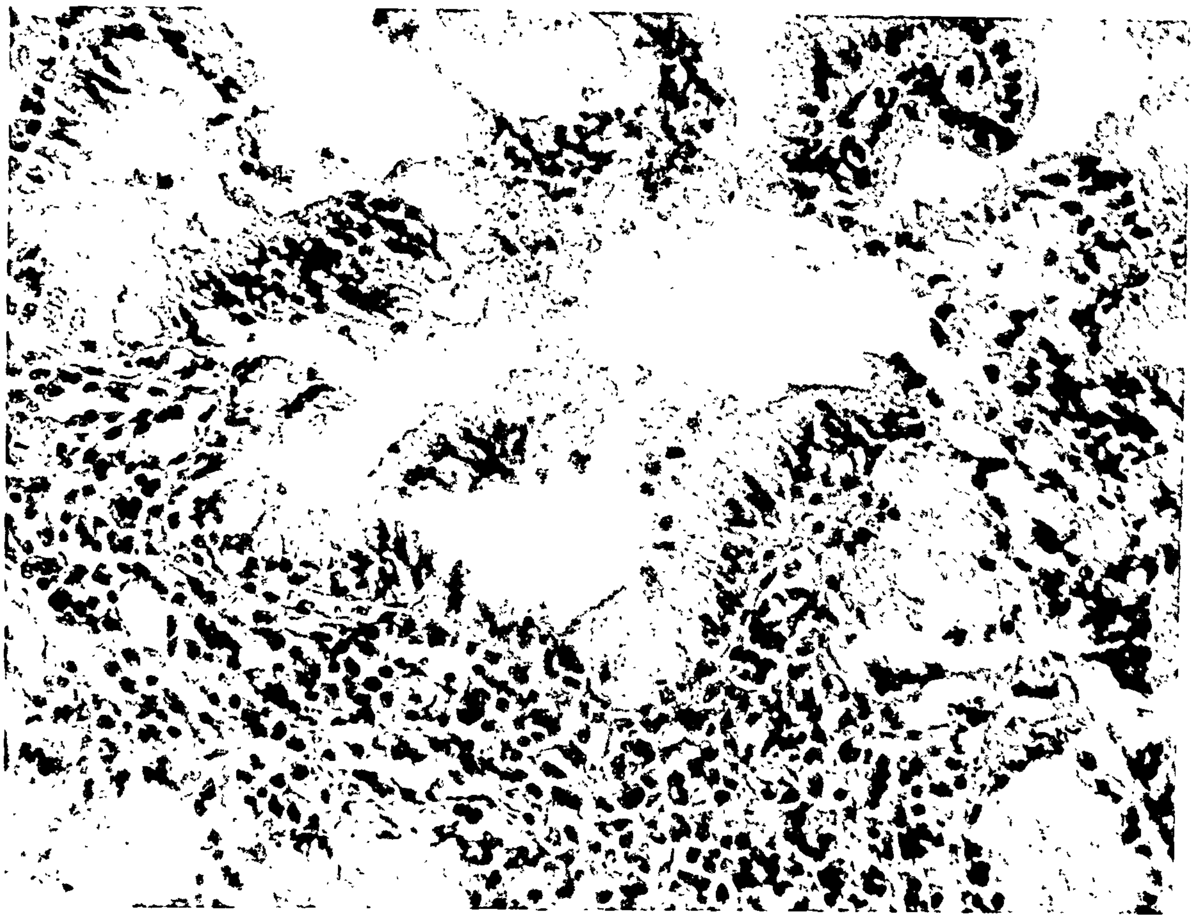

Fig. 6.—Columnar epithelium of cervix; inflammation beneath epithelium; giant cells.

metrial and cervical biopsies are repeated. Cultures and smears are also restudied when indicated.

If this investigation shows that no other lesions are present and that the cervical lesion has responded favorably to streptomycin, further treatment is withheld and the patient kept under close observation. If the response has not been satisfactory, streptomycin has been continued up to one hundred and twenty days, after which repeated biopsy specimens, cultures and smears are taken. Because of the fact that patients become streptomycin-fast and sensitization phenomena develop (itching, tinnitus, nausea, vestibular nerve damage, etc.), further streptomycin therapy is omitted. Early in this study streptomycin alone was used. Since July 1951 we have added para-aminosalicylic acid in a dose of 3 Gm. four times a day. The object of this was to combine the benefits of the bacteriostatic action of para-aminosalicylic acid and to be able to give streptomycin over a longer period without the development of unfavorable side reactions, and also to delay the resistance of bacteria observed with the prolonged administration of streptomycin alone.

In the event that further investigation discloses persistent involvement of the uterus, the tubes, the ovaries and possibly the peritoneum, the treatment adopted is similar to that previously described in our publications on the "use of streptomycin in the treatment of genital tuberculosis."[1] In brief, we give the treatment that has been outlined and operate on those patients who reveal active disease after a thorough course of treatment. With regard to operation, we should like to call attention to the treacherous nature of ovarian tuberculous disease. No one can be sure from ordinary clinical inspection that the ovary does or does not contain active tuberculous infection in every case. It is our recommendation, therefore, that the ovary be bisected to determine the presence or absence of tuberculosis that otherwise would be missed. These unrecognized sites of infection serve as foci for the postoperative spread of tuberculosis and will eventually result in destruction of the ovary. Since the prevalent teaching is that tuberculosis rarely affects the ovary, and since our experience leads us to believe that it does effect the ovary in the aforementioned manner in 5 per cent of the cases, and that the ovary is generally involved to some degree in about 33 per cent of all cases of gynecologic tuberculosis, careful consideration should be given to this possibility at the operating table in all cases.

We have long since learned that negative results from preoperative endometrial biopsy studies, both microscopic and bacteriologic, do not preclude the presence of tuberculosis in the upper part of the genital tract. Thus, local treatment of the disease, including the use of radium, is to be condemned as useless. We are in accord with D. C. Collins,[4] who stated that, "for similar reasons, roentgen therapy (and radium) will often prove to be disappointing in their end results." Roentgen therapy should be reserved for those patients who fail to respond to streptomycin, para-aminosalicylic acid and INH, and/or those for whom operation is either impossible or inadequate.

We have deliberately avoided the combination of roentgen therapy and streptomycin in order to evaluate the results obtained by the drug alone, with para-aminosalicylic acid, with INH and with surgical removal of the tuuberculous residue, after the maximum effect of the antibiotic has been attained. In our opinion, supplemental postoperative roentgen treatment should be tried in a subsequent series to see whether it has value.

It was surprising to find an incidence of 16 per cent of cervical involvement in our series of 55 patients. A consideration of this fact leads us to the inescapable conclusion that, in all cases in which it is technically possible, total rather than subtotal hysterectomy should be done. It is obvious that in some cases the danger and difficulty of this procedure may lead to a compromise whereby the cervical lesion may be destroyed by cautery or irradiation after the major procedure has been performed.

SUMMARY AND CONCLUSIONS

1. Tuberculosis of the cervix is one of the more uncommon sites of localization of the disease in the female genital tract.

2. Although cervical tuberculosis is usually of secondary origin, cases of primary origin have been reported.

3. In the authors' experience the incidence of cervical tuberculosis is 16 per cent, considerably higher than the incidence of 2 to 3 per cent reported in the literature.

4. In this series, bloody discharge was the most frequent initial clinical manifestation.

5. The condition must be differentiated from chronic cervicitis, cervical erosion and carcinoma of the cervix. Cervical biopsy, cultures, smears and guinea pig inoculation can be used for this purpose. Endometrial and cervical biopsies can be repeatedly done, without fear of initiating miliary spread of the disease, when streptomycin is used.

6. One hundred and twenty days o streptomycin therapy, preferably give with para-aminosalicylic acid, will usuall result in a marked degree of improvemen In 7 out of 9 instances in the authors' s ries the gross appearance of the cerv was restored to normal. One patient sign herself out before therapy was complet Another patient was operated on befo antibiotic therapy could be initiated. D ing the past year INH has been added our armamentarium.

7. In most cases a total hysterecto and at least a bilateral salpingo-oophor tomy should be done. The surgical mana

ment of the ovaries is predominantly dependent on whether obvious or potential involvement of the ovary is present. Those to be left *in situ* should be bisected and carefully studied.

8. If the adnexae are considered to be free of tuberculosis, or only minimally involved, at the completion of drug therapy, it is suggested that the patient should not be operated upon, provided the cervix appears normal and biopsy and culture studies give negative results.

9. As with tuberculosis elsewhere in the body, careful examination uncovers many lesions of tuberculous cervicitis that would otherwise go undiagnosed.

CONCLUSIONI RIASSUNTIVE

1. La localizzazione cervicale è una più insolite nella tubercolosi dei genitali femminili.

2. La tubercolosi cervicale è di solito secondaria, benchè ne siano descritti casi di primitiva.

3. Nell'esperienza dell'Autore la tubercolosi cervicale si è verificata nel 16% dei casi, frequenza più alta di quella usualmente riferita nella letteratura (2-3% .

4. Nella serie presentata la secrezione ematica dalla vagina è stata la manifestazione clinica iniziale più frequente.

5. La diagnosi differenziale deve essere posta con la cervicite cronica, con le erosioni e con il cancro del collo. A questo scopo saranno utili le biopsie, le colture, gli strisci e le inoculazioni in cavia. La biopsia cervicale o dell'endometrio deve essere ripetuta più volte senza timore di provocare una miliare diffusa purchè si usi streptomicina.

6. Per ottenere un miglioramento decisivo saranno necessari almeno 4 mesi di streptomicino-terapia, preferibilmente associata a PAS. In 7 casi su 9 bli Autori ottennero il ritorno alla norma del collo uterino. Dei 2 rimanenti, una si dimise prima del termine, l'altra fu operata prima dell'inizio della terapia. Negli ultimi tempi si è fatto uso, in aggiunta, anche di INH.

7. In molti casi avrebbe dovuto essere fatta una isterectomia totale o almeno una annessiectomia bilaterale. La cura chirurgica dipende soprattutto dall'interessamento, evidente o probabile, dell'avaio. L'ovaio che si decide di lasciare in situ deve essere sezionato e studiato con cura.

8. Quando si ritiene che gli annessi siano del tutto o solo in minima parte colpiti dalla tubercolosi al termine della terapia con antibiotici, si può evitare di operare il paziente pur chè la cervice abbia un aspetto normale e la biopsia e le culture siano negative.

9. Come per la tubercolosi di altre sedi, anche quella della cervice richiede un accurato esame per essere svelata.

RESUMO E CONCLUSOES

1. A tuberculose do colo uterino é uma das mais raras localisações dessa doença, no aparelho gênital feminino;

2. Regra geral é de origem secundaria, ainda que tenham sido registrados alguns casos de tuberculose primaria no colo uterino;

3. Na experiencia dos autôres, a incidencia des a doença e de 16%, consideravelmente mais elevada que aquela de 2 ou 3% usualmente registrada;

4. O sintôma mais comumente registrado pelos autôres foram perdas sanguineas;

5. O diagnostico diferencial deve sêr feite com a cervicite crônica, com as ulcerações cervicais e com o carcinôma do colo do utero. Biopsias, culturas, inoculações devem sêr usadas.

6. Preconisam os autôres o emprêgo, durante 120 dias, Streptomicinoterapia associada ao uso de acido para-amino-salicilico, tratamento que pode fornecer bons resultados.

7. Em muitos casos deve sêr praticada uma histerectomia total acompanhada de salpingo-ovarectomia bi-lateral.

8. A intervenção completa está na dependencia das condições locais dos anexos, ou nos resultados da biopsia após ter sido completado o tratamento medicamentoso.

9. Um cuidadoso exame gecal deve sêr

feito nas doentes portadôros de tuberculose en ontro qualquer orgão.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die Tuberkulose des Gebärmutterhalses gehört zu den ungewöhnlicheren Lokalisationen der Erkrankung innerhalb des weiblichen Geschlechtsapparates.

2. Wenn auch die Tuberkulose des Gebärmutterhalses gewöhnlich sekundären Ursprungs ist, so sind doch Fälle primärer Natur berichtet worden.

3. In der Erfahrung des Verfassers beträgt die Häufigkeit des Auftretens der Kollumtuberkulose 16%, was weit über dem in der Literatur berichteten Auftreten von 2 bis 3% liegt.

4. In der hier vorliegenden Serie war die blutige Absonderung das am häufigsten beobachtete klinische Anfangssymptom.

5. Differentialdiagnostisch muss die Erkrankung von chronischer Zervizitis, Zervixgeschwüren und Zervixkarzinomen unterschieden werden. Zu diesem Zwecke können Probeexzisionen, Kulturen, Abstriche und Meerschweinchenversuche ausgeführt werden. Probeexzisionen der Gebärmutter und der Kollumschleimhaut können ohne Furcht vor miliarer Aussaat der Erkrankung wiederholt ausgeführt werden, wenn Streptomyzin verabfolgt wird.

6. Eine 120 Tage lang durchgeführte Streptomyzinbehandlung, besonders wenn sie mit PAS-Gaben kombiniert ist, führt gewöhnlich zu einer hochgradigen Besserung. In sieben von neun Fällen fand der Verfasser in seiner Serie den Gebärmutterhals völlig wiederhergestellt. Eine Patientin gab die Behandlung vor Beendigung auf. Eine andere wurde operiert, bevor mit der antibiotischen Behandlung begonnen werden konnte. Während des letzten Jahres wurde INH (Jsonicotinic acid hydrazide) in den Behandlungsplan aufgenommen.

7. In den meisten Fällen sollte eine totale Resektion der Gebärmutter und wenigstens eine doppelseitige Resektion der Tuben und Eierstöcke vorgenommen werden. Die chirurgische Behandlung der Eierstöcke hängt im wesentlichen davon ab, ob eine offensichtliche oder mögliche Beteiligung des Organes vorliegt. Eierstöcke, die man im Körper lassen will, sollten durchschnitten und sorgfältig untersucht werden.

8. Wenn nach Abschluss der medikamentösen Behandlung die Adnexe als tuberkulosefrei oder als nur minimal befallen angesehen werden, sollte die Kranke nach Ansicht des Verfassers nicht operiert werden, vorausgesetzt dass der Gebärmutterhals normal aussieht, und dass die Probeexzisionen und die Untersuchungen der Kulturen negativ ausfallen.

9. Wie bei tuberkulösen Erkrankungen in anderen Körperorganen, so können auch bei der Tuberkulose des Gebärmutterhalses viele Fälle durch sorgfältige Untersuchung zur Entdeckung gelangen, die sonst unerkannt bleiben.

RESUMEN Y CONCLUSIONES

1. La tuberculosis del cervix es una de las localizaciones más raras de esta enfermedad en el tracto genital femenino.

2. Aun cuando la tuberculosis del cervix es generalmente de origen secundario, se han comunicado casos de origen primario.

3. En la experiencia del autor la incidencia de tuberculosis del cervix es de 16 por ciento, considerablemente mayor que la incidencia de 2 a 3 por ciento comunicada en la literatura.

4. En estas series la manifestación clínica más frecuente fué la descarga sanguinolenta.

5. El padecimiento debe ser diferenciado de la cervicitis crónica, erosión del cervix y carcinoma del cervix. La biopsia del cervix, cultivos, frotis e inoculaciones al cuy pueden ser usados con este fin. La biopsias endometriales y del cervix pueden ser hechas repetidamente sin miedo de iniciar una diseminación miliar de la enfermedad cuando se usa la estreptomicina.

6. Ciento veinte dias de terapia con estreptomicina preferentemente administrada con ácido para-aminosalicílico, generalmente resultan en un grado notable

de mejoría. En 7 casos de 9, la apariencia macroscópica del cervix volvió a la normalidad. Un paciente se fué antes de que se completara el tratamiento antibiótico. Durante el año pasado fué agregado el INH a nuestro arsenal terapeútico.

7. En la mayoría de los casos debe hacerse una histerectomía total y al menos una salpingo ooforectomía. El tratamiento quirúrgico de los ovarios depende principalmente de si existe una complicación obvia ó potencial. Aquellos que han de dejarse *in situ* deben ser seccionados y estudiados cuidadosamente.

8. Si se considera que las trompas estan libres de tuberculosis ó minimamente afectadas al término del tratamiento, se sugiere que al paciente no debe ser operado teniendo de antemano un cervix de apariencia normal y biopsia y cultivos negativos.

9. Como con la tuberculosis de orta parte del cuerpo, el examen cuidadoso descubre muchas lesiones de cervicitis tuberculosa que de otra manera no serían diagnosticadas.

RÉSUMÉ

1. La tuberculose localisée au col utérin est une affection des moins fréquentes des lésions génitales de la femmes.

2. Habituellement la lésion est secondaire; cependant il y a certains cas où la lésion fut initiale.

3. L'auteur opine que cette maladie se rencontre dans 16% des cas.

4. L'écoulement sanguin fut le symptôme clinique le plus fréquent.

5. Il faut en faire le diagnostic différentiel d'avec la cervicite chronique, les érosions du col et le cancer du col. La biopsie, l'inoculation au cobaye, les cultures doivent être faites à répétition. La streptomycine est d'usage.

6. Un traitement de 120 jours avec de la Streptomycine associé au PAS est avantageux. 7 des cas furent améliorés de la sorte. Depuis quelques années, les auteurs ajoutent de l'INH au traitement.

7. Dans la plupart des cas, l''hystérectomie totale avec une salpingo-ovarectomie bilatérale sont recommandées. Les ovaires doivent subir un examen minutieux.

8. Si le traitement chimio-antibiotique a donné de bons résultats, l'intervention ne doit pas se faire, surtout si les annexes semblent indemnes de même que le col, après examen histologique.

9. Tel que pour la tuberculose systémique, l'examen méticuleux fait souvent découvrir une tuberculose cervicale ignorée.

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Qualifying Examinations for Fellowship in the United States Section of the International College of Surgeons will be held on November 2 and 3, 1953. The examinations will be given at the Cook County Graduate School of Medicine and the Cook County Hospital. Applicants are requested to address communications to Dr. Harry A. Oberhelman, Secretary, Examination and Qualification Council, 1516 Lake Shore Drive, Chicago 10, Ill.

Homoplastic and Anaphylactic Procedures as Influenced by Prolonged Anesthesia

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IN contrast to autotransplantation, which with the correct indications and technic is successful in almost every case, a skin graft taken from one subject and transferred to another of the same species (homotransplant) nearly always results in sequestration.

This sequestration manifests itself also when animals of the same blood group and the same size and sex are selected. Only in the case of twins of one ovum (gemini monochorii) is adherent healing possible.

The question whether cellular or humoral factors are dominant in this process has been amply discussed.

This problem has been occupying me for decades. In a monograph published in 1924[1] I expressed the opinion that homoplasty is connected with processes related to the then relatively recent theory of protein anaphylaxis.

Owing to the difference in protein structure between donor and recipient, a local reaction comparable to the Arthus phenomenon takes place, and this reaction nearly always ends in necrosis and sequestration of the transplant.

There are many aspects in favor of this interpretation, although thus far no specific antibodies can be demonstrated in the serum.

What kind of changes are detected locally with homoplastic procedure?

1. *Macroscopic Changes.*—After a certain time the graft loses its color and consistency. The intervals differ according to the type of animal selected. A Thiersch graft in a human being may remain ten to thirty days without showing macroscopic change. Then, however, "sterile suppuration," with livid change of color, detachment, desiccation and sequestration, is established. With the rabbit these manifestations of sequestration begin after two days and terminate after twelve to fourteen days.

2. *Microscopic Changes.*—The changes commence with hyperemia of the matrix of the host and strong filling of the capillaries. The transplant succumbs to shrinkage and detachment of the epidermis, swelling and hyalin degeneration of the connective tissue and accumulation of lymphocytes in the cavity of the wound, gradually resulting in demarcation, detachment and replacement by new granulation tissue.

It is interesting to note that the reactive inflammation detachment develop more rapidly when the test is repeated on the same animal, i. e., when a "second set" homograft is performed. This manifestation is the expression of immunity of the animal that has undergone preliminary treatment. Owing to this immunity, a stronger as well as a more accelerated reaction ensues.

In some instances transplantation of epidermis by homoplastic methods has succeeded, but these must be considered exceptional and largely a matter of chance. On the whole, the fact is established that

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homoplastic transplantations of the skin do not give a lasting effect but result in sequestration.[1]

The only tissues that were amenable to successful homoplastic transplantation were those with few blood vessels, in which blood supply requirements is low. These are cornea, cartilage and arterial tubes. With such tissues the homoplastic technic is successful, as is indicated by the extensive literature on the subject.

Tissues that are marked by abundant vascularization respond to homoplastic procedures with increased blood vessel reaction, edema and accumulation of lymphocytes. Inflammatory reaction sets in, terminating in necrosis and sequestration.

A great number of attempts have been made to prolong the lives of homoplastic transplants. Immunization of the graft as well as the host was tried by systematic preliminary treatment with blood, serum, irradiation and other methods. All these experiments remained without result. Neither in animal tests nor in surgical practive could a demonstrable success be obtained.

Recently another course was tried. On the basic of the concept that sequestration of the transplant is caused by local reaction, means to weaken this reaction were sought. Agents to alter endothelial permeability, like Rutin roentgen irradiation, heating and freezing of the transplant were employed. Especially the method of brisk and vigorous freezing has gained certain importance. Several clinics take advantage of it and keep such homografts ready in a "skin bank" so that they may be applied in time of emergency.

Still more has been said about treatment of the host with ACTH and Cortisone. These remedies serve to reduce the exigencies of the transplant and thus diminish the harmful local reaction. The anti-inflammatory effect of these products was shown in animal tests as well as in practice. A real adherent healing, such as occurs after autoplastic procedures, was not obtained. Neither have we succeeded in influencing the "second set" reaction on repeating the transplantation on the same animal.

ACTH and Cortisone are most effective when administered subcutaneously or intramuscularly and are less so when applied locally. Therefore one is justified in assuming that these drugs influence the whole organism, the effect exhausting itself after interruption of the injection treatment. The same experience is well known in the treatment of arthritis. During the last five years a number of publications have appeared on the treatment of skin homografts with ACTH and Cortisone. The results are somewhat contradictory, but some authors have reported impressive results, e. g., Edwards[2] described a 9-year-old boy who suffered for four years from combustion defects and had a great number of homografts applied without success. Only after ACTH was employed could adherence be attained. In the same way, after applying ACTH for some months, Whitelaw[3] obtained adherence of homografts. He gave 20 mg. every six hours through ninety-two days!

Animal experiments, particularly thorough and precise, were made by Medawar and his collaborators.[4] This author has dealt for years with the question of homografts and has also studied experimentally the influence of Cortisone. On the basis of his experiments he concludes that the lifetime of skin homografts can be prolonged three or four times by daily subcutaneous injections of 5 mg. of Cortisone (experiments on rabbits).

After repetition of the test on the same cutaneous injections of 5 mg. of Cortisone is much weaker. The demarcation of the transplant is hastened.

The disadvantages of treatment with ACTH and Cortisone are manifold:

1. Treatment has to be continued for considerable periods, and must be administered daily. ACTH must even be injected every six hours as in the case reported by Whitelaw.
2. The course is very expensive and therefore cannot always be carried out.
3. ACTH and Cortisone have a great

number of somatic and psychic side effects. These side effects are sufficiently known from the therapy of chronic arthritis and will therefore not be described here.

4. The remedies referred to have no curative influence on wound infection. The contrary, rather, is the fact, since the resistance of the organism to pyogenic organisms is diminished. Neither is the effect on wound healing *sui generis* favorable.

My own researches in Israel started in 1935, with the collaboration of Dr. Meyer, my assistant at this time. I proceeded from the fact that anaphylactic shock in experimental animals (guinea pig, rabbit, dog) fails to put in an appearance with the animal in narcosis. This fact had been observed by Besredka[5] in 1909, and since then it had aroused but little attention; indeed, it had fallen into perfect oblivion. In 1931, inspired by a death that occurred in a surgical department after intravenous injection of peritonitis serum, I transferred the matter to human beings.[6] This injection was performed before operation, when the patient was not yet anesthetized. On the basis of my experiences at this time and with the support of evidence from animal tests, it was recommended to perform serum injections whenever possible only with the patient under general anesthesia.

In further pursuit of this idea, it was then attempted to suppress the anaphylactic shock also by local anesthesia. After numerous attempts on animals, with positive results, this method was transmitted to the human being. The results enabled me to recommend it earnestly for avoidance of anaphylactic shock (Ital. Surgical *Congress in Padua*, 1950).[7]

If it is rightly alleged that sequestration of skin homografts represents an anaphylactic reaction, it must be possible in the aforementioned way to decrease the anaphylactic reaction and prolong the lifetime of the homograft, with results similar to those achieved by the use of ACTH and Cortisone.

At my instigation, Dr. Meyer made the corresponding animal tests and reported on the material in 1937.[8] At this time we transplanted in exchange skin grafts of experimental animals. The skin graft of one animal was kept under local anesthesia, while the second animal was left untreated. Originally the anesthesia was induced by circumjecting procaine hydrochloride into the graft three times a day. Afterward we employed an anesthetic oil (Analgol, a procaine oil produced in Vienna) for prolonged action. The results were particularly promising; life of the homograft was prolonged two to three times.

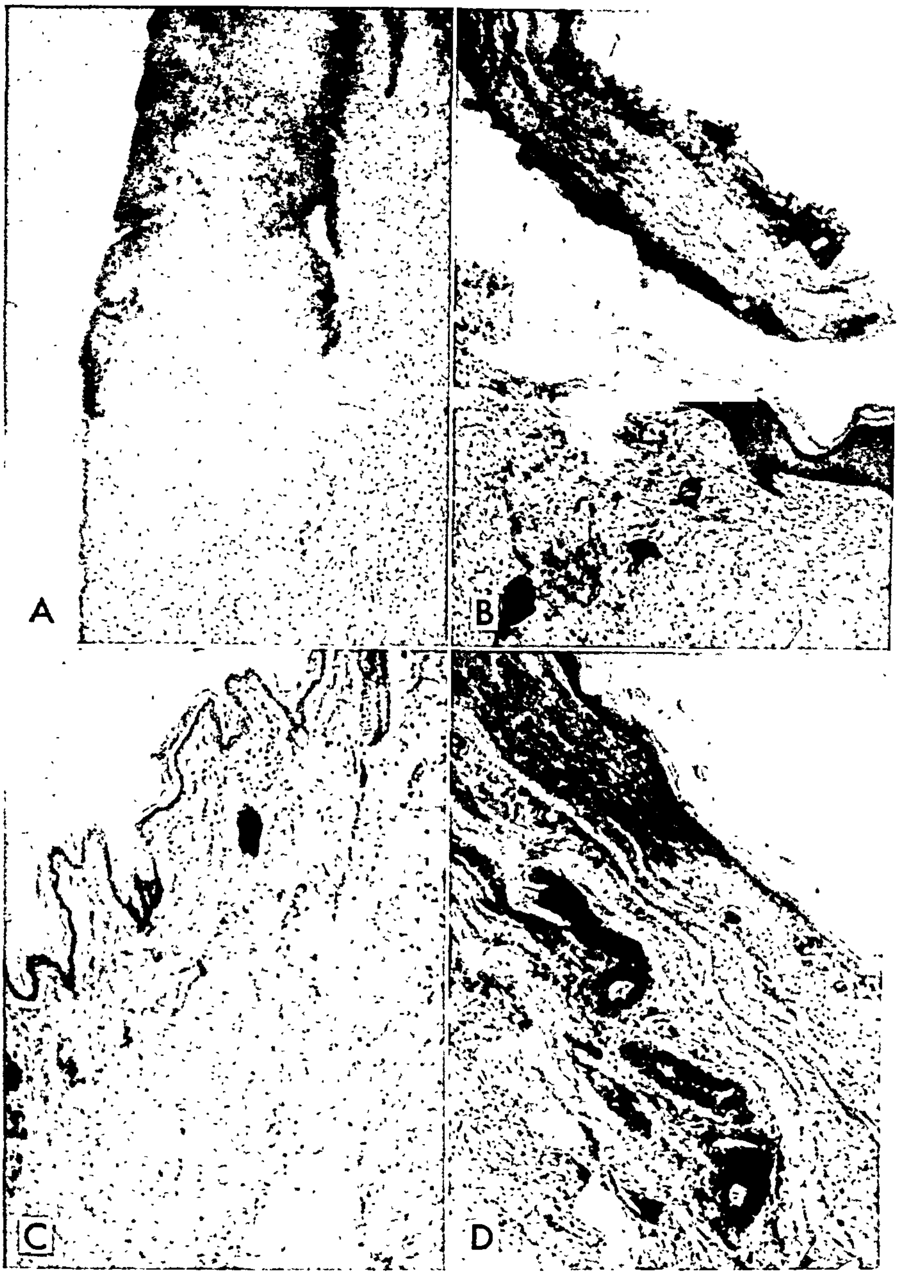
In later experiments I always obtained the same result.

Owing to the shortage of animals and their relatively high cost, we were compelled to repeat the test once or twice on the same animal. At the same time, prolonged action anesthesia proved able to suppress the acceleration of "second set" reaction. The life of the transplant remained in the repetition test the same as in the first test and was not shortened even after repeated tests on the same animal. This demonstrates one of the principal differences between the effect of this method and the effect of ACTH and Cortisone.

Three different anesthetic preparations for prolonged action have been at my disposal during recent years:

1. The English preparation Proctocain, an oil that contains procaine hydrochloride linked to benyl alcohol.
2. Polycain (Teva, Israel), a preparation similar to Proctocain and representing a procaine oil as well.
3. Prolongal-Benzocaine (Zori Ltd., *Israel), a watery solution of 2 per cent* Benzocaine in Uretha. After injection a depot of Benzocain crystals is precipitated into the tissue, and absorption of the anesthetic takes place only gradually.

After multiple tests, I finally decided for Prolongal-Benzocaine, because it is tolerated best. The oily solutions f. quently cause undesirable side effects.



A, control photomicrograph, showing concentration of mononuclear leukocytes around transplant, representing enclosure and defense against alien tissue. *B*, necrosis of homograft, with infiltration of new epithelium from border, undermining transplant. *C*, microscopic picture observed when homograft is kept under prolonged anesthesia with Prolongal-Benzocaine. Note striking contrast with control photomicrograph. *D*, photomicrograph showing greatly diminished reaction as compared to control (see text).

With regard to the technic, the following points should be noted: The field to be anesthetized is first infiltrated around and below with 0.5 per cent procaine hydrochloride solution. Then, according to the directions for the use of Prolongal-Benzocaine, this drug is injected with a dry syringe. It is important that the whole site of the homograft be blocked from sensibility. Therefore the quantity of Prolongal-Benzocaine is adjusted according to the size of the homograft.

Rabbits received injections of Prolongal-Benzocaine twice weekly without showing any signs of irritation.

With human beings, one is directed by the cessation of anesthesia. Generally a period of six to ten days will be adequate.

I refrained completely from the dressing of rabbits with circular covers. The wounds were merely painted with Mastisol and covered with a transparent glossy paper, which facilitated permanent control of the homograft.

Concerning the results I wish to report in this paper only briefly. Skin grafts (1.5 by 1.5 cm.) of the test animal (rabbit) were exchanged in whole thickness. The wounds were painted with Mastisol and a piece of sterile glossy paper stuck over that. In this way the changes of the graft could be observed as through a window. On the following day the grafts had already become livid and started to degenerate. After three to five days they were black and completely necrotic. If one of the grafts was kept under prolonged anesthesia with Prolongal-Benzocaine, the picture was different. The graft remained well nourished for three to four days and looked fresh like the surrounding skin. Then only did it gradually become livid and begin to lift itself, to discharge and to degenerate. The sequestration was completed only after twelve to twenty-four days, sometimes even much later. Therefore, under macroscopic view, the life of the homograft can be prolonged three or four times, but the graft cannot be brought to definite adherence. In case the test is repeated on the same animal (second set test), the course is the same as aforedescribed. The quick reaction encountered with ACTH and Cortisone treatment, therefore, does not occur. Prolonged anesthesia is consequently in a position to suppress the growing sensibility against protein of an alien species.

Microscopically the following observations were made on the rabbit:

On the second day, the control animal with homografts already showed local reactions of different intensity in the different tests. The epithelium of the skin graft was flattening, inclining to cornification. The capacity of the nuclei to absorb color was declining.

The connective tissue of the subepithelial layers was spongy and tended to hyaline degeneration. Here, too, the affinity of the cells to colors had decreased. Between the tracts of the connective tissue there were gaps. Edematous fluid was accumulating. The surrounding blood vessels reacted with hyperemia, new formation of capillaries and inclination to hemorrhages. An intensive gathering of mononuclear leukocytes around the transplant was developing. (This accumulation may become so dense that it appears as a "black band" in the microscopic picture. This is an expression of enclosure and defence against the alien transplant (see illustration, *A*).

In the course of a few days, perfect necrosis of the homograft was observed. Simultaneously, new epithelium from the border infiltrated and undermined the transplant (see ilustration, *B*).

After sequestration of the homograft all the layers were reformed and the skin defect had become cicatrized.

In the course of two or three weeks the process was completed, and only a more or less indifferent scar remained.

In contrast to this the microscopic picture is that observed when the homograft is kept under prolonged anesthesia with Prolongal-Benzocaine. Especially during the first days, the difference is quite striking. For two to three days the homograft may show so little change that a deviation from the microscopic picture of normal skin is scarcely recognizable (see illustration, *C*).

The following microscopic reaction observed in this series was much less intensive than with the control animal: The epidermis was preserved longer, the colorability of the nuclei longer maintained.

The cornification process as well as the edema of the connective tissue, was diminished. Correspondingly, the tendency to hyaline degeneration declined (see illustration, *D*). The difference in accumulation of leukocytes was very striking. The immigration and infiltration of these formations began later and were much less vigorous than in the control animal. A "black band" did not form at all or was delayed for twenty to thirty days. Finally, in accordance with the microscopic picture, enclosure and sequestration were macroscopically observed, too.

My experience with human beings is restricted to 5 patients with large skin defects who submitted to homoplastic procedures with amnion. The results of amnion transplantation conform in general to those reported in the literature on homoplasty. The amnion skin membrane perishes after a few days, it becomes necrotic and is expelled. Simultaneously, however, an intensive stimulation is exerted on the bottom of the wound, and the size of the wound decreases (necrohormone stimulus).

Repetition of the attempt with amnion on the same patient leads to considerable shortening of the life of the amnion, a result similar to that observed with experimental animals in the "second set." After the third, the amnion "disappears," often within twenty-four hours.

I am in a position to report on 4 patients who had undergone preliminary treatment with amnion. In all the cases extensive traumatic skin defects were present. Treatment had been successful to a degree, but improvement had finally come to a standstill.

An amnion plastic procedure was combined with prolonged anesthesia in 3 cases. (In a fifth case this combination was initiated from the beginning.)

REPORT OF CASES

CASE 1.—The patient, a man aged 50, had received a battle injury in 1948, a compound fracture of the tibia and fibula. With the greatest effort, preservation of the leg could be attained. The bony defects healed, but a large skin defect (10 by 15 cm.) on the anterior and lateral aspects of the lower part of the thigh persisted.

In 1949, a Thiersch graft from the upper part of the same thigh was applied but did not adhere.

During 1950 and 1951 a fourfold attempt was made to cover with fresh amnion. Each time the life of the amnion was shortened. After the fourth attempt the amnion disappeared already after a single day. In the meantime, the defect diminished somewhat in size, approximating 8 by 12 cm., but thereafter remained unchanged for months.

A renewed attempt was made toward amnion transplantation with simultaneous infiltration of Prolongal-Benzocaine (20 cc.) around and below the area. Slight edema arose at first but subsided after three days. The size of the wound began distinctly to diminish. The anesthesia continued for several weeks. Certain sites of the peroneus area remained hypesthetic for months.

In the course of two or three months the wound was epidermatized so far that only 2 small wound islets remained; 1.5 by 1.3 and 1 by 1 cm. All the rest was well covered with skin.

After another four weeks the small defect was compeltely closed and the longer one measured approximately 1.5 by 1 cm.

CASE 2.—A woman aged 45 had had for two or three years a large ulcus cruris varicosum left. Ligation of the saphenous vein and injection of 2 cc. of 5 per cent sodium morrhuate in the trunk of the vein were done. Surgical circumcision of the ulcer, with ligation of all supplying veins, was performed.

Since this therapy was of no avail, two attempts were made to cover the defect with fresh amnion. This led to a certain decrease in the extent of the ulcer, but then the curative tendency ceased.

The grafting of amnion was then combined with Prolongal-Benzocaine anesthesia. Ten cc. of the anesthetic was well tolerated.

Under this combined treatment an astonishing diminution and leveling of the wound took place in a short while. Within three or four weeks the wound shrunk to a fourth of its former size.

CASE 3.—A man aged 50 had pushed an iron bar against the shin. This resulted in wound infection with skin necrosis. There was a skin defect measuring 5 by 4 cm. with no tendency toward epithelization despite the use of available ointments furthering granulation, powders and general treatment.

Two attempts were made to cover the defect with amnion. The wound was diminished to 3 by 5 cm., after which the healing process was arrested. After only one combination of amnion and prolonged anesthesia with Prolongal-Benzocaine, quick healing took place in the course of two weeks.

CASE 4.—A child aged 2½ months had allegedly been burned one week after birth. There was a 5.5 by 9 cm. skin defect on the left flank, which had not decreased in size during the past weeks. Amnion transplantation combined with 5 cc. of Prolongal-Benzocaine was employed. Cure resulted within two weeks.

CASE 5.—A man aged 42 had had a trophic ulcer of the lower part of the thigh for approximately three years. Varicose veins were observed. Buerger's disease was suspected, but there were no positive signs. Three attempts were made to cover the ulcer (circular, 5 cm. in diameter) with amnion. The defect shrank to 3.5 by 4 cm., then reached a standstill. Combined amnion and prolonged anesthesia (Prolongal-Benzocaine) were employed. After ten days the amnion was expelled, but the diminishing of the wound was progressing rapidly.

After six weeks the ulcer was healed and has remained healed for one year.

SUMMARY

Homoplastic skin grafting is associated with a local reaction, which must be regarded as anaphylactic.

This anaphylactic reaction, attributed to intolerance of protein substances, nearly always ends with necrosis and expulsion of the transplant.

In this the reactive processes may stimulate healing of the wound and cause it to diminish, thus deceptively simulating a successful transplantation procedure (neohormonal effect).

Among the new drugs suggested to prolong the life of the homograft, ACTH and Cortisone are of great interest and unquestionable importance. In experimental animals, as well as with human beings, such drugs tend to suppress the local reaction and to prolong the life of the skin graft to two to three times its probable life without them. The same result is obtained by keeping the transplant under prolonged anesthesia. For this purpose, Prolongal-Benzocaine has proved to be of particular value. This method is simpler, cheaper and much quicker than the other methods.

A number of cases are reported in which wounds with long healing periods decreased to a certain degree as a result of preliminary application of amnion but then failed to react. Only by combination of amnion with prolonged anesthesia failed to react. Only by combination of amnion with prolonged anesthesia (Prolongal-Benzocaine) could striking success be obtained.

RESUMEN

El injerto cutáneo homoplástico se asocia con reacción local que debe ser considerada somo anafiláctica.

Esta reacción anafiláctica atrubuída a la intolerancia a substancias proteícas casi siempre termina con la necrosis y expulsión del transplante.

En esto el proceso reaccional puede estimular la cicatrización de la herida produciendo su disminución y simulando un éxito en el procedimiento de transplantación (efecto neurohormonal). Entre las nuevas drogas sugeridas para prolongar la vida del homoinjerto la ACTI y la cortisona son de gran interés y valo indudable. Tanto en animales como e seres humanos dichas drogas tienden suprimir la reacción local y a prolong la vida del injerto cutáneo a dos ó tr veces más que sin ellas. El mismo resulta se obtiene conservando el transplante b anestesia prolongada, para este propós el Prolongal-Benzocaine ha probado ser particular valor. El método es sim más barato y más rápido que los ot métodos.

Se comunica un número de casos en que heridas con largos períodos de cic zación disminuyeron en cierto grado, resultado de la aplicación prelimina

amnios, pero que posteriormente no respondieron. Unicamente por la combinación de amnios con anestesia prolongada (Prolongal - Benzocaine) pudo obtenerse un éxito notable.

RIASSUNTO

I trapianti cutanei omoplastici possono determinare una reazione locale che deve essere considerata di natura anafilattica.

Tale reazione, attribuita ad intolleranza verso sostanze proteiche, quasi sempre conduce alla necrosi ed alla eliminazione del trapianto.

Il processo reattivo, tuttavia, può stimolare la guarigione della ferita, come se il trapianto avesse avuto successo. Fra i farmaci che sembrano prolungare la vita dei trapianti omologhi, l'ACTH e il cortisone dimostrano un'indiscutibile efficacia. Negli animali da esperimento così come nell'uomo tali sostanze tendono a sopprimere le reazioni locali e a prolungare la vita del trapianto del doppio o del triplo. Lo stesso risultato si ottiene mantenendo i trapianti sotto anestesia prolungata. A tale scopo la Benzocaina-ritardo si è dimotrata particolarmente efficace. Questo metodo è più semplice, più economico e più rapido degli altri.

Viene riferito un certo numero di casi in cui ferite a guarigione lenta vennero migliorate fino ad un certo limite con applicazioni preliminari di amnios, ma nelle quali si ottennero successi strepitosi combinando l'amnios con l'anestesia prolungata.

RÉSUMÉ

La greffe homoéoplastique présente une réaction locale anaphylactique. Cette anaphylaxie, secondaire à une intolérance des substances protéiniques, amène habituellement la nécrose et l'élimination du greffon. Cette réaction stimule la guérison en similant une greffe réussie. Certaines substances, tel l'ACTH et la Cortisone favorisent le succès de la greffe en allongeant sa viabilité 2 à 3 fois. On peut avoir le même résultat par l'anesthésie au "Prolongal-Benzocaine" et à meilleur compte. Plusieurs cas sont discutés où le succès et la guérison furent certainement attribuables à ce nouveau procédé.

RESUMO

E apreciada a reação local taxada de anafilática, e verificada em certos casos de aplicação de homo-enxertos cutâneos. Essa reação anafilática atribuida a uma intolerancia das substancias proteicas, termina, muitas vezes, pela necrose e eliminação do enxerto.

São estudadas as substancias que têm sido empregadas para estimular um melhor resultado nêsses casos, sendo salientados o ACTH e a Cortizona. Tambem a manutenção do transplante em fazo prolongada de anestesia tem fornecido resultados satisfatórios, salientando o autôr o emprego da "Prolongal-Benzocaine" que êle julga de particular valôr, sendo um processo barato, simples e muito mais rapido que os demais.

Apresenta finalmente um conjunto de casos em que ficou demonstrado o seu pensamento no particular.

ZUSAMMENFASSUNG

Bei homoplastischen Hauttransplantationen kommt es zu Lokalreaktionen, die als anaphylaktisch angesehen werden müssen.

Diese anaphylaktische Reaktion, die auf Unverträglichkeit von Eiweissstoffen zurückgeführt wird, endet fast immer mit Nekrose und Abstossung des Transplantats.

Bei diesem Vorgang können die reaktiven Prozesse einen Anreiz zur Heilung und zur Verkleinerung der Wunde abgeben, wodurch ein erfolgreicher Ausgang der Transplantation vorgetäuscht werden kann (neohormonaler Effekt). Unter den neuen Medikamenten, die das Leben des Transplantats verlängern sollen, sind ACTH und Cortison von grossem Interesse und fraglos von Bedeutung. Beim Versuchstier sowohl als auch beim Men-

schen zeigen diese Medikamente ein Neigung, die örtliche Reaktion zu unterdrükken, und die im allgemeinen zu erwartende Lebensdauer des Transplantats um das Zwei- oder Dreifache zu verlängern. Das Gleiche wird erreicht, indem man das Transplantat für längere Zeit unter Anästhesie hält. Für diesen Zweck hat sich das Prolongal-Benzokain als besonders wertvoll erwiesen. Diese Methode ist einfacher, billiger und viel schneller als die anderen.

Es wird über eine Reihe von Fällen berichtet, bei denen Wunden mit langsamem Heilungsverlauf auf Grund vorheriger Applikation von Amnion sich bis zu einem gewissen Grade verkleinerten aber dann keine Reaktion zeigten. Nur durch eine Kombination von Amnion mit verlängerter Anästhesie (Prolongal-Benzokain) konnten schlagende Erfolge erzielt werden.

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Carcinoma of the Breast

A Ten-Year Survey at the Winnipeg General Hospital

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THIS is a review of mammary carcinomas that primarily treated at the Winnipeg General Hospital during the ten-year period 1940 to 1949 inclusive. The cases presented include those of all patients from the public wards and from the private indoor services who were treated initially at the Winnipeg General Hospital. Also included are patients referred to the public wards or to members of the Honorary Attending Staff after biopsy or a positive diagnosis elsewhere. Cases in which radical mastectomy was performed in some other center and the patients referred to the roentgen therapy department of this hospital for irradiation are not included. Patients treated elsewhere and admitted to this hospital for terminal care are also excluded.

The total number of cases included in this series was 546. The number of new cases encountered each year was fairly consistent and ranged from 40 to 62, with an average yearly occurrence of 54.6 new cases.

Sex Incidence.—During the period covered by this survey, 1 case of carcinoma of the male breast and 545 cases of carcinoma of the female breast were encountered.

Breast.—Of the 545 cases of female mammary carcinoma, the tumors in 269 occurred on the left side and in 266 on the right. Seven were bilateral when first seen. Owing to inadequacy of the records, this information was lacking in 3 cases.

Location.—By far the majority of tumors appeared in the upper outer quadrant (252 cases) : next in frequency was the upper inner quadrant (65 cases) ; third the lower outer quadrant (52 cases) ; and fourth, the lower inner quadrant (44 cases). In 35 cases the tumor was located deep to the nipple, while in 14 cases there were multiple nodules present in the breast on initial examination. Again the inadequacy of records made it necessary to delete 87 cases from this study, for in these cases the exact location of the tumor was not reported. Thus, the total number of cases under consideration as to location is 462.

Age Incidence.—The youngest patient encountered in this series was 24 years of age at the time of diagnosis while the oldest was 90. The average age was 54.1 years. Of the total series, 53.7 per cent fal into the two decades between 40 and 59.

Interval from First Symptom to Treatment.—The length of time between the patient's first symptom referable to the mammary gland and the seeking of medical advice is shown below. This information was available in 437 cases.

A point of interest in this regard also arises if the ten-year period (1940-1949) is divided into two periods, as in Table 6.

In the second five-year period (1945-1949) a much higher percentage of tumors appeared earlier (i. e., after a shorter interval between the onset of symptoms and the institution of treatment), and a relatively smaller group of patients carried on for longer periods before seeing a doctor.

This, to my mind, indicates that education of the public as to the possibility and danger of cancer is succeeding, for it is only in the past few years that widespread publicity has been given to this extremely serious problem.

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TABLE 1.—*Sites of Mammary Carcinoma*

	Number of Cases	*Percentage*
Left	269	49.64
Right	266	49.07
Bilateral	7	1.29

TABLE 2.—*Local Distribution of Tumor*

Quadrant	*Number of Cases*	*Percentage*
Upper outer	252	54.54
Upper inner	65	14.06
Lower outer	52	11.25
Lower inner	44	9.52
Deep to nipple	35	7.57
Multiple	14	3.03

TABLE 3.—*Relation of Location of Tumor to Axillary Note Involvement at Time of Radical Mastectomy*

Location	*Total Number of Cases*	*Axillary Node Involvement*	*Percentage*
Upper outer	234	138	58.9
Upper inner	60	24	40
Lower inner	40	15	37.5
Lower outer	43	22	51.2
Deep to nipple	21	14	66.6
Multiple	11	9	81.8

Pathologic Observations.—During the period covered by this survey, the classification and grading of mammary malignant tumors employed by the pathologists varied. In the last five years of the survey the classification used has been that described by Foote and Stewart,[1] which originated at Memorial Hospital. Consequently it was considered necessary, for the sake of uniformity within this paper and for the sake of an adequate and satisfactory follow-up from the point of view of the hospital itself, to reclassify all the mammary tumors surveyed in this presentation. In conjunction with Dr. J. C. Wilt of the Department of Pathology, Winnipeg General Hospital, I have reviewed all the microscopic slides and pathologic reports on these cases and reclassified them according to the criteria set forth by Foote and Stewart.

This classification is based on the histologic forms of mammary carcinoma. Gross characteristics are not necessarily related to microscopic types and consequently are not considered. The so-called inflammatory carcinoma and "carcinoma *en cuirasse*," have no specific histologic structure and are not included in this reclassification.

The classification is based on the histologic site of origin of the tumor; the nipple has been taken as the beginning point at the one extreme, followed by the duct system and then by the lobule. Finally, certain rare histologic types that do not fit in with the criteria just established are grouped separately.

1. *Nipple.—Paget's Disease of the Nipple* (Fig. 1): With this condition, as a rule, there is also an underlying malignant growth in the duct system. Histologically the skin of the nipple shows the typical large pale vacuolated cells known as Paget cells in the rete pegs of the epidermis. These cells have hyperchromatic nuclei,

TABLE 4.—*Age Distribution*

Decade	*Number of Cases*	*Percentage*
20 to 29	9	1.6
30 to 39	44	8.0
40 to 49	146	26.7
50 to 59	147	26.9
60 to 69	123	22.5
70 to 79	58	10.6
Over 80	8	1.4
Unknown	10	1.8

TABLE 5.—*Interval Between First Symptom and Treatment*

Interval	*Number of Cases*	*Percentage*
Under 1 week	27	6.1
1 week to 1 month	89	20.3
1 month to 3 months	89	20.3
3 months to 6 months	76	17.3
6 month to 1 year	70	16.0
1 year to 2 years	39	8.9
2 years to 5 years	32	7.3
Over 5 years	16	3.6

TABLE 6.—*Interval for Five-Year Periods*

Interval	*Total*	*1940-1944*	*%*	*1945-1949*	*%*
Under 1 week	27	8	29.5	19	70.5
1 week to 1 month	89	27	30.3	62	69.7
1 month to 3 months	89	29	32.5	60	67.5
3 months to 6 months	76	37	48.6	39	51.4
6 months to 1 year	70	42	60.0	28	40.0
1 year to 2 years	39	16	41.0	23	59.0
2 years to 5 years	32	14	43.7	18	56.3
Over 5 years	16	10	62.5	6	37.5

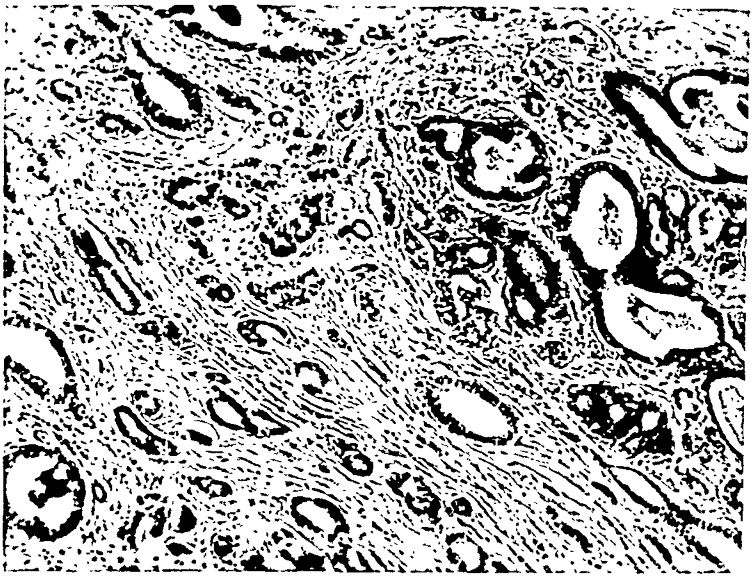

Fig. 3.—Adenocarcinoma, Grade II (x90). The glandular pattern of the infiltration is evident.

Grading.—One of the main objects in reexamination of all the slides was to make sure that the grading of the tumors would be consistent. The following criteria were used:

Grade II: This was taken to be the standard grade for carcinomas of ductal origin. The terminology implies a fairly standard regular appearance of the infiltrating process: moderate hyperchromatism, mitotic figures, little irregularity in cell shapes, etc.; i. e., little evidence of marked anaplastic characteristics. Falling into this group are the following classifications:

Infiltrating duct carcinomas	Most Cases
Adenocarcinoma	All cases
Bulky mammary carcinoma	
Colloid carcinoma	
Infiltrating papillary duct carcinoma	

Grade III: In this group there is a more definitely anaplastic picture than in tumors of Grade II. It is used for some cases of infiltrating duct carcinoma in which marked cellular irregularity is present, with linear streaking of the infiltrating cells in single columns, marked evidence of anaplastic properties and, in extreme cases, an almost acellular picture in a dense fibrous framework. The group also includes all the infiltrating lobular carcinomas.

TABLE 7.—*Pathologic Picture*

Diagnosis	*Number of Cases*	*Percentage*
Infiltrating duct carcinoma, Grade II	359	65.4
Infiltrating duct carcinoma, Grade III	34	6.4
Infiltrating lobular carcinoma, Grade III	44	8.0
Bulky mammary carcinoma, Grade II	14	2.5
Adenocarcinoma, Grade II	19	3.5
Colloid carcinoma, Grade II	9	1.6
Intraduct carcinoma	24	4.4
Infiltrating papillary duct carcinoma, Grade II	9	1.6
Papillary intraductal carcinoma	1	0.1
Carcinoma*	10	1.8
No pathologic diagnosis	26	4.7
Paget's disease of the nipple	5	0.9

*This group includes those cases in which there was not sufficient microscopic material to classify the tumor.

Staging.—For the purpose of this paper, the various classifications and gradings have been placed in two main stages. In those cases in which radical mastectomy was performed, Stage I is reserved for carcinomas that showed axillary mode metastases and Stage II for those in which the axilla is involved in the malignant process, as proved by microscopic section. No stage has been applied to carcinomas treated by simple mastectomy or biopsy. Tumors considered inoperable when first seen have also not been included in the staging process.

Pathologic Diagnoses.—Table 7 indicates the pathologic diagnoses in the 545 cases covered in this survey.

From this table it can be seen that the vast majority of carcinomas in this series were of ductal origin.

Carcinoma of lobular origin accounts for 8 per cent, while carcinoma of ductal origin accounts for 85.5 per cent of all the tumors.

Operations.—Of the total series of 545 carcinomas of the female breast, 448, or 82

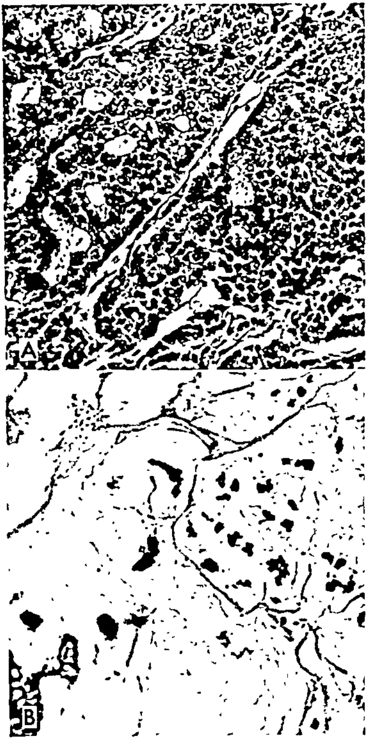

Fig. 4.—*A*, bulky mammary carcinoma, Grade II (x175). Characterized by broad sheets of large cells. Lymphoid stroma is minimal in this photomicrograph. *B*, Colloid carcinoma, Grade II (x60). Large areas of colloid, with collections of malignant cells.

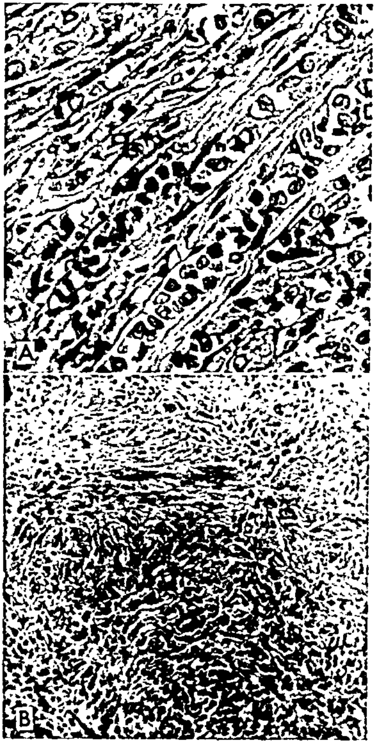

Fig. 5.—*A*, infiltrating lobular carcinoma, Grade III (x300). Infiltration in threadlike strands dispersed in a fibrous matrix. *B*, infiltrating duct carcinoma, Grade III (x90). Infiltration is in the form of linear streaks; cells are more pleomorphic than those shown in Figure 4.

was resolved by a personal decision on the part of the surgeon responsible for the case.

Of the 306 traced patients appearing in our records during the years 1940 to 1945 inclusive, 9 were treated by irradiation alone. All had far advanced malignant tumors with multiple osseous and soft tissue metastases. Apart from palliation and relief of pain, no favorable results were achieved.

Of the remaining 297 patients, 100, or 33.6 per cent, were treated by preoperative and/or postoperative roentgen therapy, in addition to radical mastectomy or simple amputation.

The technic of roentgen therapy was fairly constant during this period. Preoperatively, the involved breast and the corresponding axilla were each treated through two ports, 10 by 10 cm.; 200 kilovolts, with filtration of 1.5 mm. of copper and 0.5 mm. of aluminum. A total dose of close to 8,000 r measured in air was delivered. Postoperatively the chest wall, the axilla and the corresponding supraclavicular area were treated through three ports by a similar technic, with an average total dose of 5,000 to 7,000 r measured in air.

In a series as small as this, statistical results are not accurate and in fact may be misleading. However, for completeness the results of irradiation may be tabulated (Table 15).

TABLE 12.—*Five-Year Survival Rates with Reference to Tumor Location*

Quadrant	*Cases*	*Axillary Nodes Clear Survival*	*%*	*Cases*	*Axillary Nodes Involved Survival*	*%*	*Cases*	*Total Survival*	*%*
Upper outer	63	43	68.2	70	20	28.5	133	63	47.3
Upper inner	20	13	65	13	3	23	33	16	48.4
Lower inner	14	6	42.8	6	0	0	20	6	30
Lower outer	18	10	55.5	7	4	57.1	25	14	54
Deep to nipple	14	4	28.6	6	1	16.6	20	5	28

TABLE 13.—*Survival with Reference to Duration of Disease Prior to Treatment*

Interval	*Cases*	*Axillary Nodes Clear Survival*	*%*	*Cases*	*Axillary Nodes Involved Survival*	*%*	*Cases*	*Total Survival*	*%*
Under 1 week	6	4	66.6	5	3	60	11	7	63.6
1 week—1 month	22	15	68.1	18	9	50	40	24	60
1 month—3 months	25	15	60	17	2	11.7	42	17	40.5
3 months—6 months	23	16	69.5	24	4	16.6	47	20	42.5
6 months—1 year	30	14	46.6	20	5	25	50	19	38
1 year—2 years	14	6	42.8	8	3	37.5	22	9	40.9
2 years—5 years	11	2	18.1	3	....	....	14	2	14.2
Over 5 years	8	4	50	2	1	50	10	5	50

TABLE 14.—*Survival with Reference to Age Groups*

Decade	*Cases*	*Axillary Nodes Clear Survival*	*%*	*Cases*	*Axillary Nodes Involved Survival*	*%*	*Cases*	*Total Survival*	*%*
20-29	4	2	50	1	....	....	5	2	40
30-39	17	13	76.4	7	2	28.5	24	15	62.5
40-49	36	31	87.9	47	15	31.9	83	46	55.4
50-59	34	26	76.4	40	13	32.5	74	39	52.7
60-69	23	14	60.8	30	5	16.6	53	19	35.8
70-79	14	8	57.1	5	2	40	19	10	52.6
Over 80*									

*No patients in this age group were treated by radical mastectomy.

TABLE 15.—*Results of Irradiation Therapy*

	Number of Cases	5-Year Survival	%
Stage 1—Axillary Nodes Clear			
Preoperative irradiation	4	1	25
Postoperative irradiation	18	12	66.6
Stage 2—Axillary Nodes Involved			
Preoperative irradiation	7	1	14.3
Postoperative irradiation	63	14	22.2
Simple Amputation			
Preoperative irradiation	3	1	33.3
Postoperative irradiation	5	2	40
Totals	100	31	31

Thus, in 100 cases, the overall five-year survival rate with preoperative and/or postoperative irradiation was 31 per cent, as compared with 44.5 per cent for the complete series.

SUMMARY

A series of 546 cases of mammary carcinoma treated at the Winnipeg General Hospital is analyzed. The average age of the patients was 54 years. The incidence of carcinoma for two breasts was similar. Fifty-five per cent of the tumors were located in the upper outer quadrant.

Radical mastectomy as originally described by Halstead was performed as primary treatment in 84 per cent of the cases studied. The operative mortality rate for the series was 0.66 per cent; 91.5 per cent cent of the patients have been followed up from the time of operation to the end of 1950. The overall five-year survival rate was 44.5 per cent. In cases in which the axillary nodes were not involved in tumor (Stage 1) the five-year survival rate was 73.9 per cent.

In cases in which the axillary nodes were involved (Stage 2) the five-year survival rate was 27 per cent. In 100 cases in which either preoperative or postoperative irradiation was employed, a five-year survival rate of 31 per cent was established. The survival rate with specific regard to the microscopic diagnosis is presented in tabular form.

CONCLUSIONS

Carcinoma of the breast is commonest between the ages 40 and 59 and is uncommon before the age of 30. The vast majority of mammary carcinomas arise from the duct system of the breast.

Neither the situation of the tumor nor the age of the patient appears to affect the prognosis to any marked degree. The prognosis is shortened, however, as the duration of the disease increased.

Medical education of the public as to the importance of breast masses has proved effective, since patients are now seeking medical advice earlier in the development of the disease.

Author's Note: I wish to acknowledge the help that I have received during this investigation, expressing thanks to Dr. J. C. Wilt, Assistant Pathologist, Winnipeg General Hospital, for his helpful advice and essential aid in reviewing all the microscopic sections of this series; to the Manitoba Cancer Relief and Research Institute, and especially Mrs. McDonald and Miss Arnason, for the follow-up services on this series; to the Records Staff of the Hospital and to the Pathology secretaries for aid in obtaining necessary charts and sections; to the Honorary Attending Staff of the Hospital, whose cases I have used, and to Dr. N. P. Merkeley for his advice and criticism.

RESUMEN Y CONCLUSIONES

Se analiza una serie 546 casos de carcinoma mamario tratados en el Hospital General de Winnepeg. La edad promedio de los pacientes fuè 54 años. La incidencia de carcinoma en las doso mamas fuè similah. Cincuenta cinco por ciento de los tumores se localizaron en cuadrante supero externo.

En el 84 por ciento de los casos estudiados se empleò como tratamiento primario la mastectomía radical en la forma original descrita por Halstead. El grado de mortalidad operatoria fué de 0.66 por ciento, habiéndose seguido desde el tiempo de la operación hasta fines de 1950 al 91.5 por ciento. En los casos con complicaciento sobrepasaron los cinco años de supervivencia. Los casos en los que no hubo nódulos axilares (Estadío 1), el grado de supervivencia de cinco años fuè de 73.9 por ciento. En los casoos con complicación de ganglios axilares (Estadío 2), el grado de supervivencia de cinco años fué de 27 por ciento. En 100 casos en los que

se usó irradiación preoperatoria ó postoperatoria se estableció 31 por ciento de supervivencia a los cinco años. Se presenta en forma de cuadro el grado de supervivencia en relación al diagnóstico microscópico.

El carcinoma mamario es común entre los 40 y los 59 años y raro antes de los 30 años. La gran mayoría de los carcinomas mamarios se originan del sistema canalicular del seno.

Ni la situación del tumor ni la edad del paciente parecen afectar el pronóstico apreciablemente. Sin embargo, el pronóstico se acorta conforme aumenta la duración de la enfermedad.

La educación pública como la importancia de las tumoraciones mamarias ha probado ser efectiva, ya que los pacientes buscan actualmente atención médica más precozmente en el desarrollo de la enfermedad.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Es wird eine Serie von 546 Faellen von Brustdruesenkarzinom, die im Winnipeg General Hospital behandelt wurden,analysiert. Das Durchschnittsalter der Kranken betrug 54 Jahre. Das Karzinom trat in beiden Bruesten ziemlich gleichmaessig auf. 55% der Geschwuelste hatten ihren Sitz im oberen aeusseren Quadranten.

In 84% der hier untersuchten Faelle wurde eine radikale Brustdruesenresektion, wie sie urspruenglich von Halstead beschrieben wurde, ausgefuehrt. Die Operationssterblichkeit betrug in der vorliegenden Serie 0,66%; 91,5% der Kranken wurden vom Zeitpunkt der Operation ab bis zum Ende des Jahres 1950 weiter verfolgt. Die fuenfjaehrige Ueberlebensperiode wurde im Ganzen von 44,5% der Kranken erreicht. Von den Faellen, die keine Beteiligung der Achsellymphknoten aufwiesen (Stadium I), erreichten 73,9% die fuenfjaehrige Ueberlebensperiode. Von denen mit Beteiligung der Achsellymphknoten (Stadium II) ueberlebten 27% die Fuenfjahresperiode. Unter 100 Kranken, die entweder vor oder nach der Operation bestrahlt wurden, konnte in 31% eine fuenfjaehrige Ueberlebensperiode festgestellt werden. Die Ueberlebensquote in Beziehung zum histologischen Befund wird in Tabellenform dargestellt.

Der Brustdruesenkrebs tritt am haeufigsten im Alter zwischen 40 und 59 Jahren und selten vor dem 30sten Jahre auf. Die grosse Mehrzahl der Karzinome hat ihren Ursprung im System der Brustdruesengaenge.

Die Prognose aendert sich nicht nennenswert mit dem Sitz der Geschwulst oder mit dem Alter der Kranken. Die Lebensaussicht verkuerzt sich aber je laenger die Krankheit besteht.

Die medizinische Aufklaerung der Oeffentlichkeit hinsichtlich der Bedeutung von Geschwuelsten in der Brust hat sich insofern als wirksam erwiesen, als die Kranken aerztlichen Rat in einemen frueheren Stadium der Krankheit suchen.

RÉSUMÉ

L'auteur analyse 546 cas de cancer du sein traités au Winnipeg General Hospital. L'âge moyen fut de 54 ans; les deux seins étaient également intéressés; 55% des tumeurs siégeaient au quadrant supérieur externe.

La technique de Halstead fut employée dans la proportion de 84% avec une mortalité de 0.66%. Le taux de survie après 5 ans fut de 44.5%. Dans les cas sans envahissement ganglionnaire, le taux de survie fut de 73.4%. Pour les cas avec envahissement, il fut de 27%. La radiothérapie pré et post-opératoire donna après 5 ans une survie de 31%. Cette affection est commune et le public devrait être éduqué afin de l'amener à consulter plus tôt.

RESUMO E CONCLUSOES

O autôr apresenta um estude babseade em 546 casos de carcinôma da mama tratados no "Winnepeg General Hospital," chegando a diversas conslusões, entre as quais; idade média verificada aos 54 anos,

incidencia igual às duas mamas, localização do tumôr em 55% dos casos no quadrante superior externo.

A operação radical preconizada pele Halstead foi utilizada como tratamente inicial em 84% dos casos observados, acusando uma mortalidade de 0,66% sendo 91,5% das doentes accompanhadas desde a data da operação até 1950; a média de sôbrevida após cinco anos de operação atingio 44,5%; nas doentes em que os ganglios axilares não estavam comprometidos, foi verificada uma sôbrevida de 5 anos em 73,9%, enquanto que nos casos em que os ganglios axilares estavam atingidos, a sôbrevida de 5 anos alcançou apenas a 27% das doentes. Em 100 doentes nas quais a irradiação pre ou posoperatória foi utilizada, observou-se uma sôbrevida de 5 anos em 31% dos casos.

Conclue ainda o autôr o seu estudo, afirmando qque a idade media mais comum para diagnostico da enfermidade é aquela compreendida entre os 40 e 59 anos, sendo pouco comum antes dos 30. Nem a idade da doente e tãopouco a localização do carcinôma parecem influir sôbre o prognostico das diferentes casos.

Termina preconizando uma campanha de educação do publico visando despertalo sôbre a necessidade de um diagnostico precoce de vantagem inconteste no prognostico do carcinôma da mama.

RIASSUNTO E CONCLUSIONI

Vengono analizzati 546 casi de carcinoma della mammella trattati al Winnepeg General Hospital. Le pazienti avevano in media 54 anni. La frequenza del carcinoma fu uguale nelle du mammelle. Il 55% dei tumori aveva sede nel quadrante supero-esterno.

Nell'84% dei casi studiati si eseguì, come trattamento primario, la mastectomia radicale secondo Halstead. La mortalità operatoria fu, nella serie, del 0,66%; il 91,5% della pazienti è stata seguita dal momento dell'operazione fino alla fine del 1950. Le media di sopravvivenza oltre 5 anni fu del 44,5%. Nei casi in cui non vi erano metastasi ascellari (Stadio 1) la media di sopravvivenza ai 5 anni fu del 73,9%. Nei casi in cui vi erano metastasi ascellari (Stadio 2) la media di sopravvivenza ai 5 anni fu del 27%. In 100 casi si eseguì, sia prima che dopo l'intervento operatorio, terapia radiante; la media di sopravvivenza ai 5 anni fu del 31%. La media di sopravvivenza, con particolar riguardo alla diagnosi microscopica, è presentata in tabelle.

Il carcinoma della mammella è frequente fra i 40 e i 59 anni, raro prima dei 30. La gran parte dei cancri mammari si origina dai dotti.

La prognosi non viene ad essere influenzata, in maniera apprezzabile, nè dalla sede del tumore, nè dalla età della paziente. In ogni modo la prognosi peggiora quanto più a lungo dura la malattia.

E' importante che il pubblico sia edotto sul significato delle tumefazioni mammarie onde ottenere che le malate si rivolgano al medico nelle fasi più precoci della malattia.

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Delay in Definitive Treatment of Carcinoma of the Bladder

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ALTHOUGH it is often initially difficult to select a program of treatment for tumors of the bladder, unnecessary delay of definitive therapy for any malignant growth is reprehensible. The problems of case selection and appropriate therapy for each case exist. None the less, there must be some reasonable limit beyond which one cannot rely entirely upon continuing local therapy of vesical carcinoma, even though the tumor apparently remains confined to the bladder. This generalization, in good conscience and with good reason, may apply to any type of local therapy, namely, external, high voltage roentgen irradiation; radon or radium implantation; cautery excision (either transurethrally or through an open cystostomy incision), or partial cystectomy.

Marshall has reported treatment by radical cystectomy of vesical carcinoma inadequately controlled either by radiotherapy, repeated transurethral fulgurations or segmental resection.[1] Basically, Jewett and Strong's classification of such tumors[2] was utilized in Marshall's publication, although the latter author specified additional criteria for preoperative evaluation of tumors. The duration of life of patients with variously treated bladder tumors has been heatedly debated.[3] However, differences in classification of the same tumor[4] confuse estimation of the results of treatment as much as do differences in type of treatment *per se*.[5]

The present report describes 4 cases in which the patients with carcinoma of the bladder were abandoned as "beyond helpful treatment" at the time they were transferred to the Francis Delafield Hospital. In each instance, however, the tumor was still apparently confined locally, and simple cystectomy proved feasible. It should not be inferred from this remark that all 4 tumors were "curable." It is emphasized that critical clinical and laboratory tests performed on these 4 patients indicated the presence of localized vesical disease without demonstrable dissemination.

The following evaluations have been adopted in this institution as minimally necessary to support preoperative evaluation of local confinement of a bladder tumor:

1. Negative results for roentgen examinations of the skeletal system and of the lung fields for metastatic lesions.
2. Normal serum alkaline phosphatase activity.
3. Negative results from bimanual (recto-abdominal or vagino-abdominal) palpation as to fixation of the tumor or as to palpable, lateral spread of induration.

Although cell blocks of urinary sediment, cystoscopic investigation and contrast cystographic studies are adjuncts to the other useful routine methods for detecting bladder tumors, none of these can indicate the degree of extension or the most suitable treatment of any individual lesion.

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Transurethral biopsy of the tumor is mandatory. With the resectoscope, it is almost invariably easy to obtain evidence of muscle infiltration if it is present in the biopsy specimen. Prognosis, as well as initial therapy, is influenced by the histopathologic report on the transurethrally removed specimen. Finally, since anesthesia (most feasibly induced by the spinal route) is used for bimanual palpation, the transurethral biopsy specimen can be conveniently obtained at the same time.

This system of evaluation has been applied to the 4 cases reviewed in detail in this communication.

REPORT OF CASES

CASE 1.—M. E., a 65-year-old white married male shipping clerk, a native of Russia, was admitted to the Urology Service of the Francis Delafield Hospital on Feb. 13, 1951, as a transfer patient from another metropolitan hospital. His past history was not remarkable except for hemorrhoidectomy performed in 1938.

The pertinent urologic facts dated from 1936, at which time frequency of micturition and a burning urethral sensation were subjectively noted. By 1938 the patient had begun to observe "purplish" discoloration of the urine. At that time he sought medical advice and was hospitalized for cystoscopy. Transurethral therapy of an unspecified type was instituted for "tumor of the bladder." Again in 1941, cystoscopy and transcystoscopic fulguration were performed. There was no further suggestion of bleeding until 1945, when dark clots of blood were passed *per urethra*. The patient was admitted to a hospital, but no definitive therapy was undertaken. A transurethral prostatic resection, transurethral removal of a biopsy specimen of the bladder tumor and suprapubic loop resection were carried out. Subsequently, the urine remained blood-free. Cystoscopic observations at three-month intervals were said to have yielded negative results. In August 1949, severe frequency of urination required another period of hospitalization. Some "pills" were administered, with considerable relief; detailed urologic examination was deferred. Four months later, after the urethral passage of a jelly-like clot, the patient gained hospital admission once more and was treated by transcystoscopic fulguration. Eight months after this, in August 1950, further gross hematuria ensued; at that time, laparotomy and bilateral cutaneous ureterostomy constituted the therapy. Six months later, and fifteen years after the development of a lesion in the bladder, the patient was transferred to the Francis Delafield Hospital, as a "hopelessly advanced case of bladder cancer."

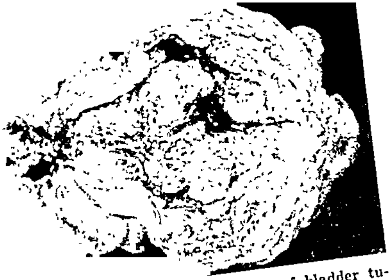

Fig. 1.—Gross surgical specimen of bladder tumor in Case 1, cut sagittally (anteriorly), consisting of bladder, prostate and seminal vesicles. Anterior wall indurated to palpation. A fungating purple-pink lesion 4.5 cm. in diameter and 2 cm. in height is located on anterior wall. A roughened, eroded area approximately 1 by 2 cm., representing site of previous removal of biopsy specimen, appears on trigone. No other epithelial lesions observed. Prostate, seminal vesicles and a 1-cm. segment of prostatic portion of urethra grossly normal. Diagnosis: Transitional cell epithelioma of urinary bladder.

The past history, family history and systemic review were not contributory to analysis of the patient's status on admission to this institution. Considerable physical and emotional distress attended the constant dribbling of urine from the cutaneous ureterostomies over the anterior abdominal wall. Skin cups, which had been used to collect the ureterostomy urine, were regarded as unsatisfactory by the patient, and he had resorted to the use of towels worn in belt fashion to sop up the urine as it formed.

Physical examination disclosed the patient to be stocky, healthy-looking and of a whining temperament. In each hypochondrium, in the anterior axillary line, ureterostomy ostia, each about 5 mm. in diameter and flush with the skin, were seen to spurt clear urine. The entire suprapubic skin was indurated and showed a brownish discoloration in the pattern of roentgen grid. Healed scars were

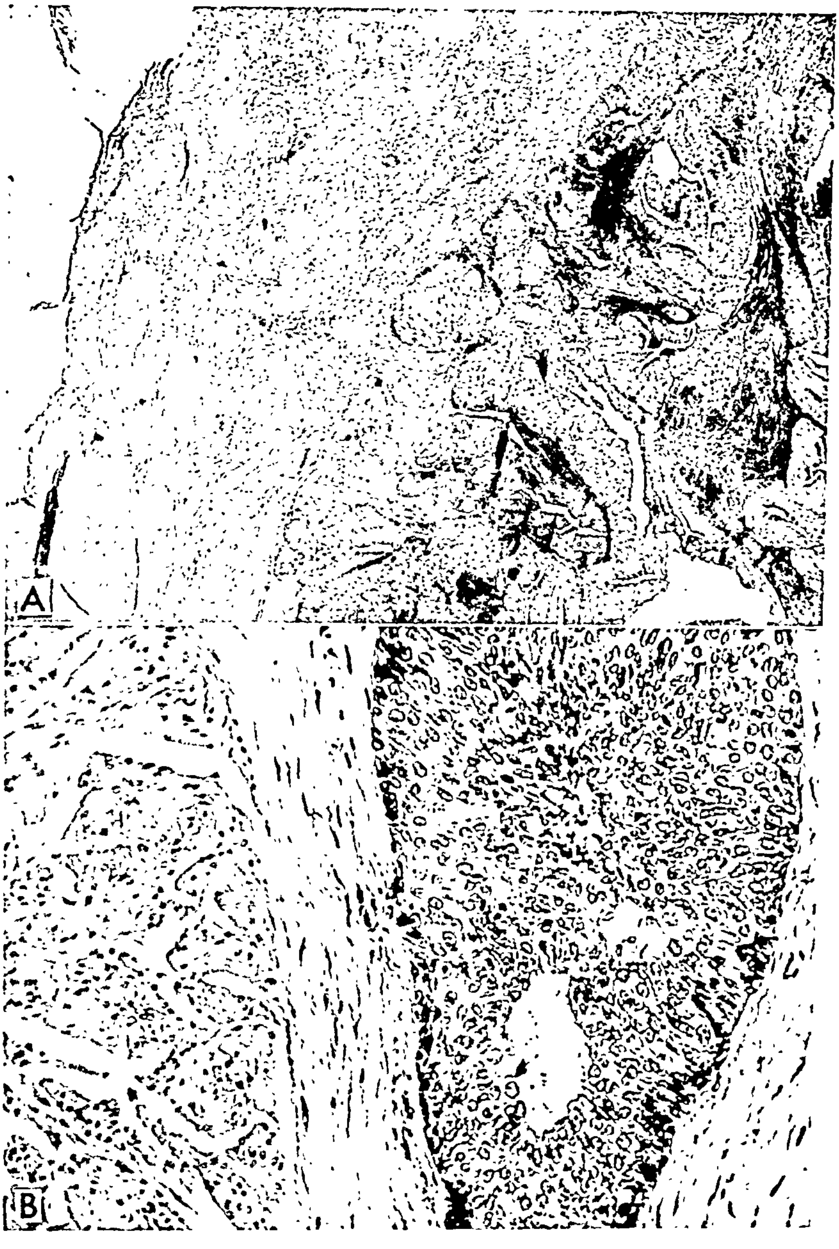

Fig. 2.—Photomicrographs of transitional cell epithelioma of urinary bladder (Case 1). *A*, solid, anastomosing cords of tumor cells extending into bladder wall (x 30). External surface is at left. *B*, higher magnification (x 90) demonstrating group of tumor cells in an intramuscular septum.

each hypochondrium and in the suprapubic midline. The genitalia were normal. Rectal examination gave negative results except for enlargement of the prostate to one and one-half times its normal size. The consistency of the gland was normal. The skin over the sacrum bore signs of roentgen grid therapy.

Laboratory studies revealed only 6 Gm. of hemoglobin per hundred cubic centimeters of blood. There were 3,000,000 erythrocytes and 5,900 leukocytes per cubic millimeter. The value for serum nonprotein nitrogen was 41 mg., and that for total proteins 7.1 Gm., per hundred cubic centimeters. The carbon dioxide combining power was 45 volumes per cent, and the value for sodium chloride was

104 milliequivalents per liter. A differential phenolsulphonphthalein test indicated excretion of 23 per cent of the dye from the right kidney and 27 per cent from the left in two hours. Intravenous pyelographic study demonstrated moderate bilateral hydro-ureteronephrosis, somewhat more pronounced on the right.

By administration of whole blood and 6:1,000 sodium lactate solution the blood picture was brought to normal values within ten days. With the patient under low spinal anesthesia, a biopsy specimen was obtained transurethrally and recto-abdominal bimanual palpation was performed. A large, fungating tumor occupying the base of the bladder and the right lateral wall proximal to the vesical neck was visualized. The extrinsic postradiation fibrosis made equivocal any palpable clinical evaluation as to extravesical extension of the tumor. The histopathologic report described "a moderately differentiated transitional cell epithelioma invading the muscularis."

On March 5 an exploratory laparotomy revealed neither distant metastases nor regional lymphatic involvement. A total cystectomy was done, during which considerable technical difficulty was encountered as a result of fibrosis from previous surgical procedures and radiotherapy. In addition to confirmation of the results of vesical biopsy, pathologic study showed an independent, microscopic carcinoma of the prostate, which, however, did not invade the fascia of the seminal vesicles.

The postoperative course was uneventful. Granulation of the suprapubic midline incision was incomplete: a defect of the wound edges persisted at a point located 1 inch (2.5 cm.) below the umbilicus. Within thirty days, the value for serum nonprotein nitrogen rose progressively from 50 to 70 mg. per hundred cubic centimeters. On the thirtieth postoperative day a small furuncle developed near the right ureterostomy ostium and threatened to occlude that orifice. Local heat and oral aureomycin controlled this superficial infection within twenty-four hours. The patient was discharged from the hospital on April 27, having been held as an in-patient primarily because of difficulty in arranging outside convalescent care.

During the following three months he was observed in the Outpatient Clinic. The serum nonprotein nitrogen remained continuously at a level of about 60 mg. per hundred cubic centimeters. The infra-umbilical wound defect (superficial to the anterior rectus fascia) remained clean. A gradually advancing constriction of the right ureterostomy ostium produced demonstrable progression of the hydroureteronephrosis as seen by intravenous pyelographic study. This ostium was revised surgically on July 25, during a brief hospitalization. The dilatation of the upper part of the urinary tract then regressed somewhat. Until November the patient fared generally well. The value for serum nonprotein nitrogen remained at about 50 mg. per hundred cubic centimeters. The ureterostomy caliber was tested about once monthly by the retrograde passage of soft rubber catheters, and remained at 16 F. bilaterally.

No evidence of residual tumor had been noted nine months after total cystectomy.

A report from another metropolitan hospital has just been received to the effect that the patient died on Dec. 4, 1951, of what appeared to be uremia. Although the events leading to the demise were not fully elucidated, untreated right ureterostomy obstruction was cited. Unfortunately, no autopsy was permitted.

Gross and microscopic specimens of the tumor are shown in Figures 1 and 2.

Comment.—It would be of interest to know how many of the several physicians who treated this patient regarded him as cured. The various forms of therapy utilized did not influence the growth of the tumor. Surely, at some point in the case history, the inadequacy of the treatment employed should have become obvious.

CASE 2.—J. B., a 62-year-old white married circus trapeze artist, retired, sought investigation by the Urology Service of this Hospital on March 21, 1951, for intermittent hematuria of twelve years' duration. When, in 1939, painless hematuria first appeared, a urologist observed a bladder tumor cystoscopically (site not specified) and recommended operation. Treatment was refused by this inordinately stubborn patient.

Hematuria ceased soon afterward. During the following ten years, small clots appeared in the urine about twice annually. The patient's general condition was unaffected, and he elected to ignore the urinary signs.

During the two years just prior to the second admission, the frequency of passage of blood clots *per urethra* increased. For one month prior to the first hospitalization here,

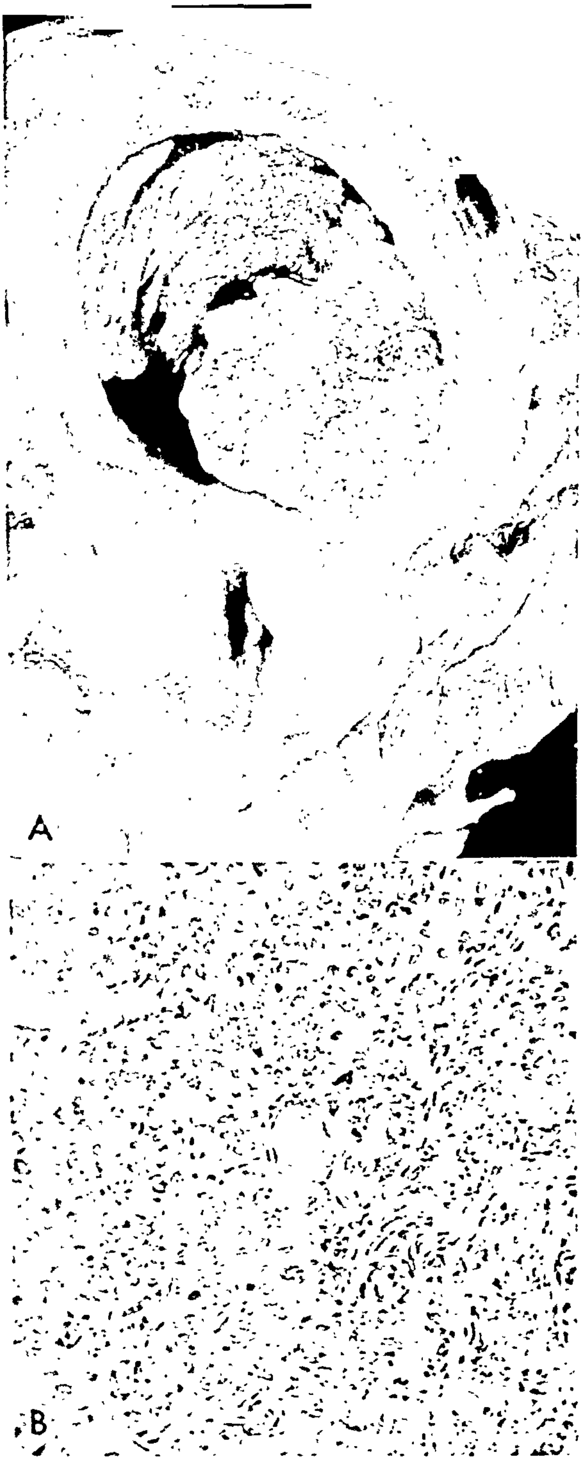

Fig. 3.—Vesical tumor removed at autopsy in Case 2. *A*, anterior view of bladder in contracted state, bisected lengthwise. A pink, papillary growth, 2 cm. in diameter at base, 3 cm. in diameter at dome and 3 cm. in height, arises from left lateral wall. Epithelium underlying tumor normal in consistency; epithelium otherwise normal throughout. Prostate negligibly enlarged but revealed no malignant change. *B*, photomicrograph showing widely scattered transitional cells, with no invasion of muscularis. Papillary formation not evident in this section (x90). *Diagnosis:* Transitional cell epithelioma of urinary bladder, moderately differentiated.

large clots were voided regularly, often thrice daily, without local discomfort or generalized weakness. There had been no weight loss. Decrease of appetite of three years' duration and a "mild decline of energy" during the past two years were the only associated systemic complaints. A chronic cough, present for thirty years and attributed by the patient to excessive cigarette smoking, was cited in the history.

Physical examination revealed the patient to be hale and muscular. He looked well and appeared to be only 50, rather than his stated age of 62 years. An 8 cm. area of dullness to percussion and auscultation was present in the hilar area of the right lung field, posteriorly. No other relevant physical signs were noted. The prostate was normal to palpation and was thought to be only slightly enlarged.

Urinalysis disclosed albuminuria (reaction, 3 plus), with 145 red and 5 or 6 white blood cells per high power field. The blood hemoglobin level was 12.8 Gm. per hundred cubic centimeters and the red blood cell count 4,690,000 per cubic millimeter. The differential count was normal. The value for serum nonprotein nitrogen was 33 mg. per hundred cubic centimeters; other laboratory investigations gave normal results. Cystoscopic study revealed a fungating papillary bladder tumor with a base measuring about 2 cm., located on the left lateral wall, about 2 cm. lateral and 2 cm. superior to the left ureteral orifice. Intravenous urographic study indicated normal upper urinary tracts and a filling defect on the left bladder wall. Routine roentgenograms of the chest disclosed a right paramedial hilar mass of homogenous density; this was interpreted as a primary bronchogenic tumor rathen than a metastatic lesion from the bladder neoplasm.

With the patient under spinal anesthesia, on March 26, a biopsy specimen of the bladder tumor was taken transurethrally and a recto-abdominal bimanual examination was done. A histopathologic report of "transitional cell epithelioma, moderately differentiated, with deep muscular invasion" was rendered. No extravesical extension of the tumor could be found by palpation.

A bladder operation of any kind was flatly rejected by the patient. He finally consented to external irradiation of the bladder with the 2,000,000 volt unit. In preparation for this treatment, a localization cystogram was made in all views, with the bladder empty and filled, to permit calculation of port direction and tumor dose. Between March 27 and May 6, radiotherapy totaling 3,000 r was given over a twelve-day period through 1 anterior and 2 posterior pelvic ports. During this period a 6 cm. right supraclavicular mass developed, as did anorexia and a loss of 5 pounds (2.3 kg.) in weight. On April 13 distention of the neck veins supervened, and within five days a full-blown superior mediastinal syndrome was obvious. This situation was treated symptomatically and by administration of 1,500 r tumor dose in a ten-day period with the 2,000,000 volt radiotherapy unit. Biopsy of the right supraclavicular mass was refused by the patient. Subjective respiratory improvement ensued within three days, and the right supraclavicular mass disappeared almost completely within one month. Roentgenographic examinations of the right hilar lesion demonstrated some extension of the tumor, and pleural effusion with slight elevation of the right hemidiaphragm appeared between mid-April and mid-May.

Aside from slight dysuria and blood-tinged urine at every micturition, the patient remained remarkably free of symptoms from his bladder tumor until August. Blood counts, chemical tests of the blood and urine cultures gave normal results.

No further hospital visits were made between mid-July and the patient's death at home on September 20. In the final month of life marked anorexia, weakness, weight loss, dysuria and hematuria were prominent, and were controlled only partially by ever-increasing doses of morphine.

Autopsy was performed at this Hospital about 9 hours after death by Dr. Mitchell W. Heinemann:

The body was cachectic. A small sacral decubitus ulcer was seen. The right side of the diaphragm was not elevated. The edge of the liver extended 8 cm. below the xyphoid process. No gross hepatic metastases were present.

About 2,000 cc. of slightly cloudy, gelatinous clot was observed in the right pleural space; the lung was collapsed, but at the apex it was densely adherent to the pleura. A large mass involving the upper portion of the right lung was seen extending into the hilar region but not producing mediastinal shift. Tumor mass completely surrounded the right upper main bronchus, wholly destroying the bronchial wall and obstructing the lumen with soft, necrotic tissue. The adjacent tracheal wall, to the carina medially and 2 cm. above the carina laterally, was invaded by tumor tissue and was partially ulcerated. The lung tissue distal to the mass showed a softened necrotic area resembling an abscess, though without a fixed confining wall. A large mass of lymph nodes was observed in the space below the bifurcation of the trachea. The left lung was normal.

Just above the right auricle a mass of hard tissue compressed and completely obstructed the inferior vena cava.

In the bladder, a pink papillary mass 3 cm. in diameter was seen to arise from the left lateral wall by a base 2 cm. in diameter, located 2 cm. lateral and 2 cm. superior to the left ureteral orifice. The muscular wall underlying the tumor was not increased in consistency. The bladder epithelium was otherwise smooth. The ureters and ureteral orifices were normal; there was no obstruction.

The prostate was slightly enlarged. The seminal vesicles were normal in size, shape and form.

On the lateral surface of the left kidney an ivory-yellow mass 2 cm. in diameter was seen protruding from the surface in the midline and extending into the kidney parenchyma for approximately 1.5 cm. No inflammatory or hydronephrotic reaction was present nearby.

The adrenal glands were of normal size, but the right was distorted by a mass of ivory-colored tissue 1 cm. in diameter, located at one pole.

Three small (0.5 cm. in diameter, each), acute, shallow stomach ulcers were noted along the lesser curvature. Microscopically, at the base of the largest of the three ulcers, there were tumor cells similar to those of the lung tumor.

The final diagnoses (based on tissues of interest, including the histopathologic specimens), was carcinoma of bronchus (right, middle and upper), poorly differentiated, with metastases to the mediastinum and in mediastinal lymph nodes, the right gland, the stomach, the left renal cortex

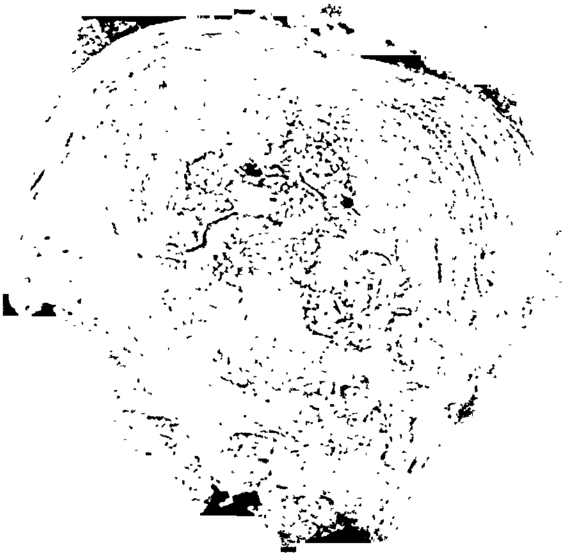

Fig. 4.—Surgically removed bladder in Case 3 hemisected anteriorly. Multiple epithelial tumor growths observable on all surfaces of organ. Largest tumor located at right lateral wall, just superior and lateral to ureteral orifice. Left ureteral orifice unobscured. Perivesical adipose tissue grossly normal. Diagnosis: Papillary transitional cell epithelioma of urinary bladder.

the right retroperitoneum, following carcinoma of the lung; transitional cell epithelioma of the urinary bladder, poorly differentiated, penetrating into the muscularis; chronic cystitis, and chronic prostatitis.

Gross and microscopic specimens of the bladder tumor are shown in Figure 3.

Comment—This was a case of lethal obstinacy on the part of the patient. When, however, surgical intervention was first refused, roentgen therapy could have been instituted at once, and it might well have altered the course of the disease. The development of a primary bronchogenic lesion is of incidental interest to the topic of this communication. It does, however, emphasize the fact that multiple primary malignant tumors often coexist, and that the finding of one such lesion should increase — not decrease — the exhaustive search for a second.

CASE 3.—M. S., a 61-year-old white married woman, stated that hematuria had suddenly developed while she was moving heavy furniture in July 1948. Her family physician was promptly consulted and suggested that a "ruptured blood vessel of the bladder" had caused the urinary bleeding. Oral medication was given, and the hematuria ceased within three days. However, during the ensuing three months hematuria continued to recur with any strenuous exertion. In May 1950 another episode of hematuria took place and was associated with urinary frequency. After multiple penicillin injections had failed to relieve the urinary complaints within five days, urologic consultation was sought. Cystoscopy revealed the presence of a bladder tumor, and the patient was admitted to a metropolitan hospital from July 23 to August 12. There, transurethral electroresection of part of the tumor was done and the remainder was fulgurated.

Histopathologically, the tumor was reported as "transitional cell papilloma with spread beyond the confines of the bladder." The condition was deemed inoperable, and roentgen therapy was given through 3 ports daily over a twelve-day period, with a 250 Kv. unit, to a total dose of 1,990 r in air through each port. Chest films taken at this time demonstrated a round opacity superior to the right pulmonary hilus which was finally interpreted as a calcified tuberculous lesion rather than a metastasis.

After this therapy, the patient gained 16 pounds (7.3 Kg.) in a month, so that total weight loss since onset of the illness was only 8 pounds (3.6 Kg.). However, hematuria persisted intermittently. In November, 1950, the urinary bleeding was exacerbated during a twenty-day siege of "pleurisy." There was no further definitive treatment and no urologic follow-up. The patient's family independently brought her to the Francis Delafield Hospital for study. She was admitted on July 2, 1951, exactly three years after the onset of hematuria. The past history was normal except for a uterine suspension in 1919.

Physical examination disclosed the patient to be short and moderately obese, but healthy-looking. Fine, moist inspiratory rales were heard in the interscapular area. A healed right lower paramedian surgical scar was seen on an abdominal wall characterized by excessive panniculus adiposus. Pelvic examination disclosed mild cystocele and moderate rectocele. No induration around the bladder nor vesical tenderness was present. Laboratory studies showed a blood hemoglobin level of 13.8 Gm. per hundred cubic centimeters and an erythrocyte count of 4,800,000 per cubic millimeter of blood. The value for serum non-

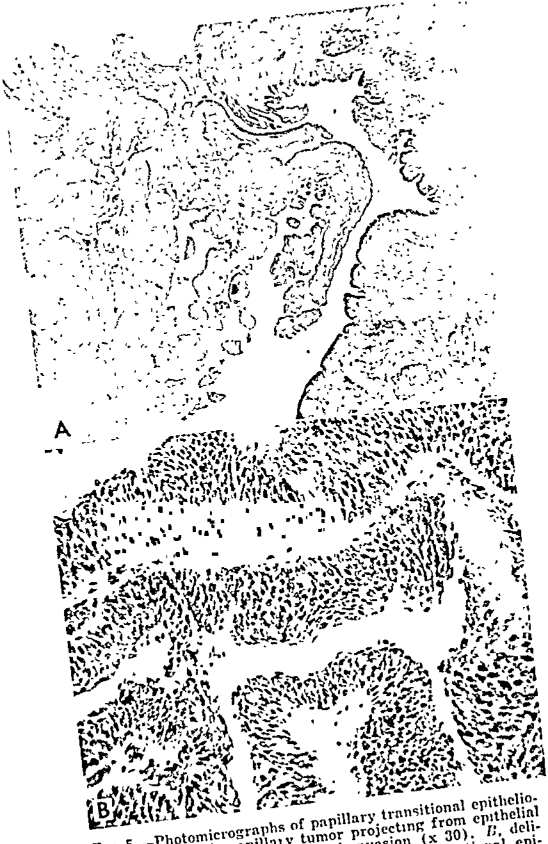

Fig. 5.—Photomicrographs of papillary transitional epithelioma in Case 3. *A*, papillary tumor projecting from epithelial surface of bladder without mural invasion (x 30). *B*, delicate connective tissue stalks covered with transitional epithelium, comprising bulk of tumor formation (x 90).

protein nitrogen was 39 mg. per hundred cubic centimeters, and other blood chemical values were normal. Urinalysis revealed 1 to 5 white blood and 20 to 25 red blood cells per high power field. A culture of the urine grew E. coli communis. The urinary sediment, by smear and cell block, gave positive evidence of cancer cells. The electrocardiogram was normal. An intravenous pyelogram demo
strated a normal condition in the upper pa
of the urinary tract, slight dilatation of t
lower third of the right ureter and a la
filling defect on the right side of the blad
the lesion extended across the midline o
bladder to encroach upon the left lateral
A gallstone was observed roentgenographi

ly. The chest film revealed a 1-cm. calcification in the right upper lobe, anteriorly; the previous interpretation of a calcified tuberculous nodule was upheld here. No bony metastases were indentified by roentgenographic skeletal survey.

On July 6, 1951, with spinal anesthesia, a transurethral biopsy specimen was taken of a large tumor of the right lateral wall of the bladder. Multiple independent papillomas were seen along the left lateral wall and the base of the bladder. The large tumor on the right lateral wall occupied that half of the trigone, partially occluding the ureteral orifice and extending over the right posterior bladder wall, almost to the dome. Vagino-abdominal and recto-abdominal bimanual examination indicated absence of any induration or fixation of the bladder. The histopathologic diagnosis was transitional cell epithelioma of the bladder, well-differentiated, invading the submucosa.

After a five-day bowel sterilization program, an exploratory laparotomy was performed on July 18. No distant spread and no local lymphatic invasion of the tumor were found. Cystectomy and bilateral ureterosigmoidostomy of the Nesbit-Cordonnier type were done. The bladder specimen was described as "bearing a epithelial surface studded by numerous, soft, white, friable, papillary tumors. The largest was located on the right lateral wall, just superior and lateral to the ureteral orifice; it was 4.5 cm. in diameter on the free surface and was attached by a 2-cm. pedicle. In all, 27 discrete tumors were counted. Several small tumors were observed lateral to the left ureteral orifice, and others on the left side of the trigone, below the ureteral orfice. Partial obstruction by tumor of the right ureteral orifice was present. All but the large tumor appeared grossly to be confined to the epithelium and microscopically even this one extended only to the lamina propria." Postirradiation cystitis was also identifiable microscopically. *In summary, the multiple transitional cell papillary tumors were confined to the vesical epithelium.*

During the last two hours of the four-hour operative procedure surgical shock supervened, despite adequate blood replacement. Postoperatively the blood pressure could be maintained only by intravenous nor-epinephrine, which kept the reading at 140 systolic and 60 diastolic over twenty-four hours. Within thirty-six hours postoperatively the blood pressure was 220 systolic and 80 diastolic without use of vasopressor agents. The patient's condition seemed good. The parenteral fluid intake was 2,500 cc. daily, including 500 cc. of whole blood given daily during the first seventy-two hours after the operation. An electrocardiogram on the third postoperative day showed myocardial insufficiency. In the evening of the third postoperative day the patient suddenly became cyanotic, and the blood pressure fell from 220 systolic and 80 diastolic to 160 and 60 respectively. No respiratory complaints were made. Oxygen inhalation was begun because rales could be heard now at both lung bases. The differential diagnosis between cardiac decompensation and pulmonary embolization was considered, so digitalis was given. During the evening of the fourth postoperative day the blood pressure dropped to 90 systolic and 40 diastolic, and bronchcodilatory drugs were given without effect. Death occurred late in the evening of the fourth postoperative day.

Autopsy was performed twelve hours after death by Dr. Mitchell W. Heinemann. The body was described as that of a well-proportioned elderly woman showing no evidence of recent weight loss. There was a recent midline abdominal incision. Clots of blood were present between the loops of bowel. The bladder was surgically absent, and the ureters were functionally and anatomically well anastomosed to the rectosigmoid junction. About 800 cc. of bloody fluid was present in each pleural space. A few fibrous adhesions were present over the upper lobes of both lungs; the strongest and most numerous were at the right apex. The calcification in the right upper lobe described radiographically was a healed, tuberculous nodule. The heart was enlarged to 360 Gm. Fifty cc. of straw-colored fluid was present in the pericardial sac. Although diffuse atherosclerosis existed in the coronary arteries, the lumens were patent. Most of the myocardium of the right ventricle (grossly and microscopically) was replaced by fat, which interdigitated with the muscle fibers. The kidneys and ureters were normal, macroscopically and microscopically.

The final diagnosis on tissues pertinent to this discussion, including the microscopic data, was: transitional cell epithelioma of the urinary bladder, controlled (by cystectomy and bilateral ureterosigmoidostomy four days prior to death); embolism of the pulmonary artery (microscopic); foreign body (blood) in peritoneum; petechial hemorrhages, frontal cortex; acute congestion, hemorrhage and edema of the lungs; bilateral hemothorax; adipose tissue infiltration of the right myocardium; necrosis of the pituitary gland, and generalized atherosclerosis. Gross and microscopic specimens of the bladder tumor are shown in Figures 4 and 5.

Comment.—Two years of oral medication for hematuria attributed to a ruptured blood vessel seems excessive. When urologic treatment was at last started, it was based upon an incomplete diagnostic evaluation and an erroneous conception of the extent of the lesion. Although this patient gained nothing from the total cystectomy, it was of some value to learn from autopsy that no residual tumor was present after the operation.

CASE 4.—A. L., a 64-year-old white housewife, was referred to Delafield Hospital on Aug. 20, 1951, and was admitted for treatment of a bladder carcinoma of eight years' duration. Her medical expenses for previous treatment had exhausted her finances and necessitated her seeking other than private medical attention.

Eight years prior to admission, intermittent hematuria had appeared on several occasions a few days apart. The patient promptly consulted a local physician, who prescribed pills that controlled the urinary bleeding within three days. Urologic consultation was then arranged. Cystoscopic study led to hospitalization, and suprapubic loop fulguration of a "bladder tumor" was performed. In addition, 5 radon seeds were implanted into the bladder. Six months of relatively symptom-free status ensued, and then dysuria, plus intermittent hematuria, developed. Another urologist was consulted, and "wartlike growths" of the bladder were removed cystoscopically during an office visit. Within two months these vesical "growths" had recurred, and hospitalization was ordered. A transurethral procedure (type unknown to patient) was performed. After discharge from the hospital, frequency of urination, nocturia and isolated episodes of hematuria comprised her symptoms for the next seven years.

Two months prior to admission, an automobile ride over a rough road had caused urethral discomfort and local bleeding. On August 15 the patient's urologist requested a period of hospital study. By cystoscopic study "a large, shaggy easily bleeding neoplasm attached to the posterior vesical wall and obscuring the left ureteral orifice in a bladder of 5-ounce capacity" was identified. Cystographic examination revealed "a filling defect of the bladder and at least 3 radon seeds." The vesical neoplasm was not treated, but "a very mild urethral caruncle" was fulgurated, with topical anesthesia. Then the patient was referred to the Francis Delafield Hospital because of the financial distress previously cited.

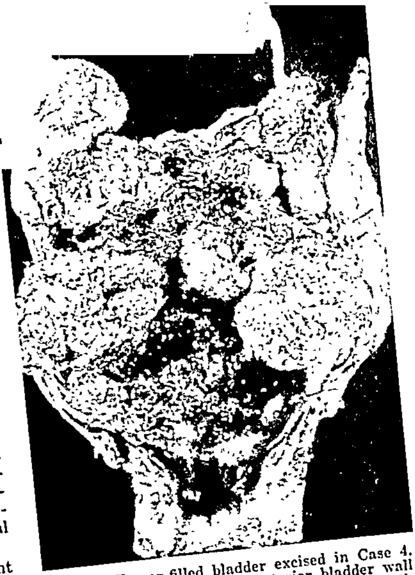

Fig. 6.—Tumor-filled bladder excised in Case 4. Vertical resection through anterior bladder wall [illegible] occupied by papillary growth [illegible] of bladder. Transitional cell [illegible] moderately differentiated.

The past history was not directly pertinent to the present illness. A single pregnancy had occurred thirty-four years earlier and resulted in full-term delivery of a healthy son, now living and well. The menstrual history had been normal; menopause, at the age of 41 years, was uneventful. For the past seven years urinary complaints prevailed and consisted of nocturia (two or three times nightly), urethral burning during and after micturition and diuria (about hourly). A weight gain of 10 pounds (4.5 Kg.) had been noted during the past seven years.

Physical examination revealed a healthy-looking, moderately obese woman appearing about 60 years of age. She was exceedingly self-indulgent. The blood pressure in millimeters of mercury was 140 systolic and 80 diastolic and other vital signs were normal. Abdominal palpation revealed no abnormality. Pelvic examination revealed no urethral caruncle, even after an indwelling Foley catheter ejecting slightly blood-tinged urine was removed. The genital organs felt normal. No gross abnormality of the bladder could be felt; no evidence of local spread of the neoplasm was grossly definable.

The blood hemoglobin level was 16.5 Gm. per hundred cubic centimeters. Urinalysis showed 1 to 3 white blood cells and 1 to 10 red blood cells per high power field. All blood chemical values were normal, including an alkaline phosphatase level of 3 Bodansky units. The blood volume, as estimated by intravenous Evans blue, was normal. An intravenous pyelogram demonstrated the upper portion of the urinary tract to be normal except for slight calyceal, pelvic and ureteral dilatation on the left. An irregular filling defect of the left lateral bladder wall, containing 3 small metallic foreign bodies, was observed. A roentgenographic skeleton survey and a thoracic film showed no metastases. The electrocardiogram was normal.

On August 22 with spinal anesthesia, a transurethral biopsy specimen was taken of a large papillary tumor occupying the dome of the bladder and extending posteriorly to the right and left lateral walls, leaving a free epithelial area along the right posterolateral wall. Multiple independent implants were seen along the base of the bladder and on the trigone. Neither ureteral orifice was visible. By bimanual vagino-abdominal and recto-abdominal palpation, no extravesical extension of the tumor was felt. The specimen was reported histopathologically as "a rather well-differentiated papillary transitional cell epithelioma." One week later a bilateral ureterosigmoidostomy and appendectomy were done, after psychiatric consultation had paved the way in evaluating and developing the patient's adaptive ability to accept a new program of bowel function. Three weeks later an abdominoperineal total simple cystectomy was done. The postoperative course was smooth and the patient was discharged twelve days after cystectomy.

In the Outpatient Clinic, blood chemistry tests and intravenous pyelograms were normal. One month after discharge from the hospital an ileoabdominal fistula developed. This tract obliterated itself on the fourth hospital day, after an indwelling rectal catheter was used in conjunction with chemotherapeutic sterilization of the bowel. After being closed for 9 days, the fistula reopened and was again demonstrable by instillation of radiopaque dye. A similar program of bowel care prompted closure of the fistula within one week. During this third hospitalization the value for blood hemoglobin was found to be 11.5 Gm. per hundred cubic centimeters. A transfusion of 500 cc. of whole blood was given; and serum hepatitis with jaundice developed. Conservative therapy was followed by normal liver function tests within two weeks. Then, left popliteal thrombophlebitis supervened and was controlled by anticoagulants without untoward effects. The patient was discharged after thirty-five days of hospitalization. She returned one week later with reopening of the ileoabdominal fistula. Closure was again achieved, in five days, by bowel sterilization, this time by antibiotics.

Despite loss of 15 pounds (6.8 Kg.) in weight since cystectomy, all laboratory data have remained normal to the time of writing. Satisfactory bowel control exists, and excretion of urine per rectum has not proved too disturbing for this patient. Though it is possible and indeed likely that occult tumor cells persist, there is no clinical evidence of it. Incomplete sterilization or possibly some foreign body may be considered the basis for the recurrent fistula formation, until proven otherwise.

Gross and microscopic specimens of the bladder tumor are depicted in Figures 6 and 7.

Comment.—Once again the history of palliative treatment, in this case over an eight-year period, is the dominant feature. Resort to more radical therapy at a much earlier time would almost certainly have achieved a definitive cure. At the time of writing it appears that the patient's comfort has been greatly enhanced by removal of the bladder. Moreover, there is a chance that she has been freed of can-

is still unsettled. Aside from multitudinous statistical data purporting to favor one or another treatment, administered singly or in combination, there are no inviolate rules for selection of a given therapeutic scheme. However, it is reasonable to suppose that vesical carcinoma is a multicentric epithelial neoplasm in some instances.[6] Even the benign papillomas manifest themselves at different sites within the bladder, often with such disconcerting rapidity that rather frequent cystoscopic observations are required to keep pace with them. One may be deluded into a false sense of security by the apparent success obtained by managing seemingly local, superficial growths wholly by the transurethral route.

Just when a tumor will begin to invade the deeper tissues of the bladder is unknown. Nor can the moment of lymphatic metastasis be predicted. Finally, the need for repeated transurethral observations is burdensome to the patient and will often terminate in disaster.

The dilemma rests between a desire to preserve the urinary bladder as a functional unit and to spare the patient the ever-present danger of spread of tumor beyond local confines. Enough reports have been published to indicate that none of the currently utilized programs of local control of bladder cancer, namely, roentgen therapy, implantation of radon or radium, suprapubic partial cystectomy or transurethral fulguration, suffices to destroy the tumor in all cases. Although vesical function is preserved by these measures, the tumor may persist and may pass out of control at any time. Therefore, one must resort to exploratory laparotomy when muscular invasion by the mucosal tumor is discovered by biopsy and when any suspicion develops of local extension beyond the bladder by bimanual abdominal palpation.

Too much stress cannot be directed toward the necessity of including muscularis in each transurethral biopsy and fulguration of bladder epitheliomas. Thus, if there be, for example, 4 independent lesions in the bladder when observed by a periodic cystoscopic investigation, each lesion must be adequately removed along with the underlying muscularis. The tumor is as malignant as its most malignant constituent part. If only one of numerous growths demonstrated extension into the muscularis, further local therapy would not be indicated. Or, if the pattern of histological differentiation of the tumor were to show change toward anaplasia, this index as to the limited value of further local therapy would be apparent.

Choice of the patient as a candidate suitable for drastic revision of his bowel function is a delicate one. Cognizance must be taken, obviously, of the fact that cystectomy is not by any means an invariable method of cure of bladder cancer. Thus, the general condition of the patient, the operative mortality rate.[7] The matter of personality adjustment to a rectal excretory pathway, the anticipated life expectancy of the individual patient and the likelihood of cure by cystectomy must all be carefully evaluated prior to and during removal of the bladder.

Should recurrence of the vesical neoplasm develop later, more radical surgery —such as pelvic exenteration — may be feasible.[8] The same detailed considerations as to surgical intervention, now even more pronounced, must be studied as to risks involved and benefits to be gained.[9]

SUMMARY

Four cases of vesical epithelioma of long duration are presented to illustrate the evils stemming from delay of definitive treatment. It is suggested that palliative or possibly therapeutic benefits may accrue to the patient from suitable radical treatment even after inadequate evaluation has caused him to be dismissed as hopeless.

Methods of preoperative analysis of vesical tumors are reviewed. It is emphasized that choice of a therapeutic program for a given patient should aim at the greatest excretory comfort compatible with the longest tumor-free life expectancy.

RESUMO

Os autôres apresentam quatro casos de epiteliôma da bexiga, de longa duração, discutindo a terapeutica empregada, os resultados obtidos, os metodos pre-operatórios para o diagnostico dos tumôres vesicais em geral, e a base a sêr adotada na técnica cirúrgica a sêr praticada.

RÉSUMÉ

L'auteur rapporte quatre cas de tumeur de vessie afin de démonstrer la gravité de cette maladie quand elle est négligée. Cette affection est traitable lorsque le patient ne consulte pas trop tard. L'auteur énumère et discute les divers moyens thérapeutiques de contrôler cette maladie.

RIASSUNTO

Vengono presentati 4 casi di epitelioma della vescica di vecchia data, per illustrare i danni der vanti dal differire la cura radicale. Si ritiene che il paziente possa ottenere benefici dal trattamento radicale anche quando sia stato dichiarato incurabile da una valutazione insufficiente.

Vengono elencati i metodi per lo studio preoperatorio dei tumori vescicali. Si sottolinea il fatto che la scelta del programma di cura in ogni singolo caso deve essere regolata in modo da concedere il massimo beneficio, dal punto di vista urinario, compatibile col prevedibile periodo di sopravvivenza.

RESUMEN

Se presentan cuatro casos de epitelioma vesical de larga duración a fin de ilustrar los perjuicios debidos al retardo del tratamiento definitivo. Se sugiere que los beneficios terapeùticos paliativos pueden resultar en un tratamiento radical adecuado aùn después de que una valorización impropia a desahuciado y quitado la esperanza al paciente.

Se revisan los métodos de análisis preoperatorio de los tumores vesicales. Se hace notar que la elección del programa terapeútico para un paciente dado debe pugnar por la mayor comodidad para la excreción compatible con la mayor supervivencia.

ZUSAMMENFASSUNG

Es wird ueber vier Faelle von lange bestehendem Blasenepitheliom berichtet mit der Absicht, die ueblen Folgen der Verzoegerung energischer Behandlung darzulegen. Es wird darauf hingewiesen, dass eine angemessene radikale Behandlung sich fuer den Kranken als palliativ oder moeglicherweise therapeutisch als segensreich erweisen kann, selbst wenn er auf Grund unzulaenglicher Beurteilunng seines Zustandes als hoffnungslos aufgegeben war.

Die Methoden praeoperativer Untersuchung von Blasengeschwuelsten werden kritisch besprochen. Es wird betont, dass man bei der Auswahl eines Behandlungsplanes fuer den jeweiligen Kranken das Ziel im Auge haben sollte, die günstigsten Ausscheidungsmoeglichkeiten zu schaffen, die mit den besten Aussichten für eine lange Lebensdauer und Geschwulstfreiheit vereinbar sind.

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A New Operation for Diversion of the Urine, with Voluntary Control of Feces and Urine: Preliminary Report

OSWALD S. LOWSLEY, M.D., F.A.C.S., F.I.C.S.,
THOMAS H. JOHNSON, M.D., AND ANTONIO E. RUEDA, M.D.

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THE problem of diverting the urinary stream is reduced, in the final analysis, to two fundamental factors, both of which must be met if the patient is to be returned to long life and normal social activity. These are: (1) normal kidney function, without progressive renal damage or reabsorption of toxic material, and (2) continence of feces and urine, to permit a normal and productive existence.

Unfortunately, there has appeared no procedure that satisfies both requirements, and the tendency of late has been to sacrifice the patient's social and economic life, burdening him with incapacitating colostomies and ureterostomies in order to preserve renal tissue and normal blood levels. Bilateral ureterosigmoidostomy originally appeared to satisfy both requirements, but has now been shown to offer a poor prognosis.

Deficiencies of Present-day Procedures.—In brief, the various procedures employed in the past offer certain advantages in particular, but all have inherent deficiencies:

1. *Diversion to the Skin:* Cutaneous ureterostomy requires clumsy equipment for collection of the urine. Of all the methods used, it is probably the most incapacitating to the patient.

2. *Diversion to the Large Bowel:* Regurgitation of urine in a cephalad direction permits reabsorption of the urinary contents, resulting in chronic azotemia and hyperchloremia. There is also mixing of the fecal and urinary streams, contributing to ascending infection of the urinary tract and probably to structure formation at the site of the anastomosis.

3. *Diversion to an Isolated Segment of Intestine:* Successful procedures have been reported in which the cecum and the proximal end of the colon were used as an artificial bladder, with the ileocecal valve providing sphincteric action. Other procedures have included anastomosing isolated segments of intestine to the vesical neck. In principle, these methods separate the fecal and the urinary stream—a definite advantage. The brilliant work of Boyce, however, demonstrated the reabsorptive powers of the more proximal portion of the colon and the inadvisability of using it as a reservoir for urine. Another objection is the presence of an obvious unnatural orifice in the patient's body, without voluntary control of evacuation. Anastomosis of a segment of intestine to the neck of the bladder can hardly permit the performance of total cystectomy when diversion of urine is necessitated by malignant disease of the bladder.

Advantages of the Authors' Operation.—During the progress of the present study we were pleased to note a very important article by Kinman, Sauer, Houston and Melick. Eight cases were presented in which the isolated rectosigmoid was utilized as a reservoir for urine and the fecal stream diverted by an abdominal colostomy. Significant was the hyperchloremia or acidosis

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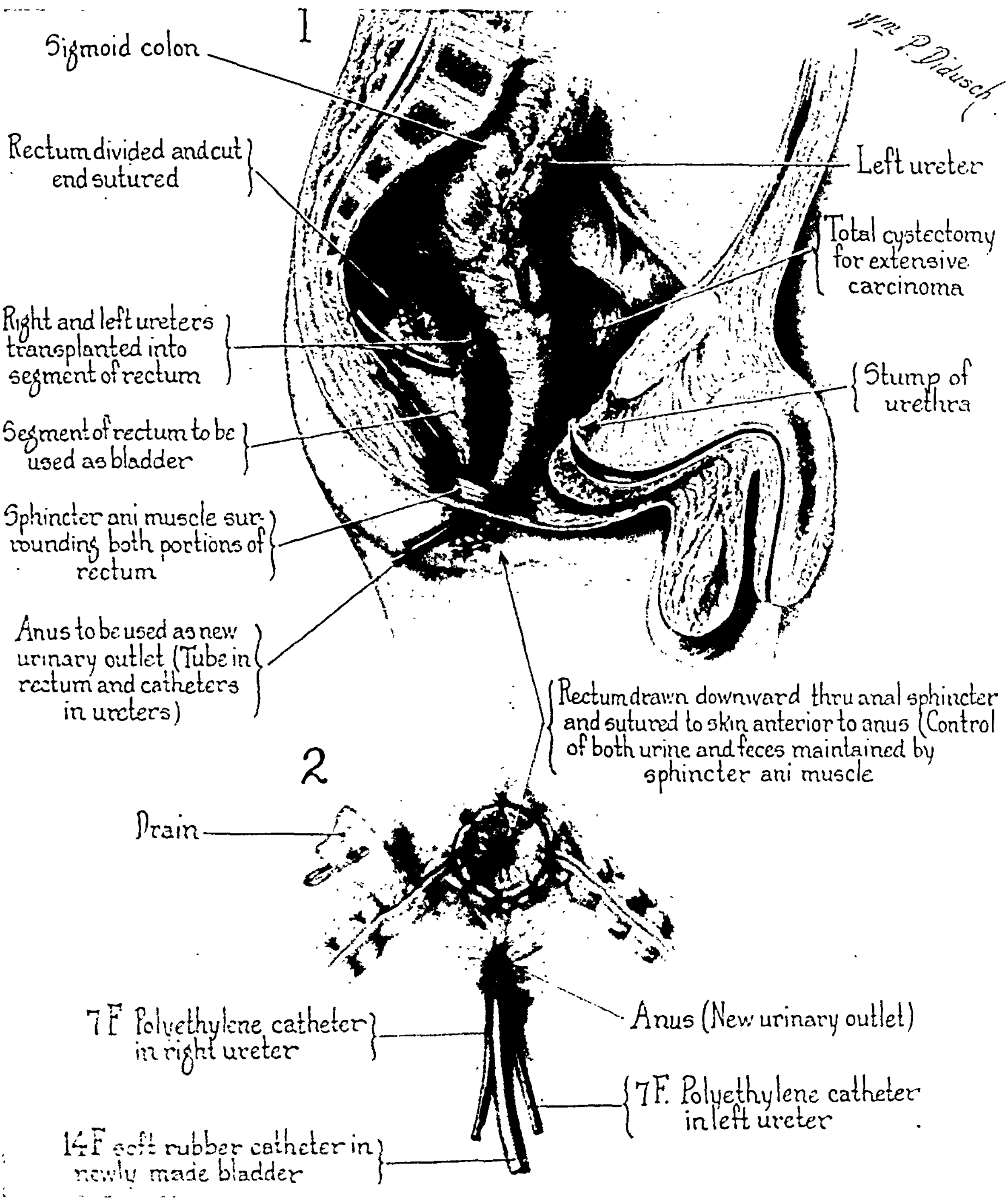
1
Wm. P. Didusch
Sigmoid colon
Rectum divided and cut end sutured
Left ureter
Total cystectomy for extensive carcinoma
Right and left ureters transplanted into segment of rectum
Stump of urethra
Segment of rectum to be used as bladder
Sphincter ani muscle surrounding both portions of rectum
Anus to be used as new urinary outlet (Tube in rectum and catheters in ureters)
Rectum drawn downward thru anal sphincter and sutured to skin anterior to anus (Control of both urine and feces maintained by sphincter ani muscle
2
Drain
Anus (New urinary outlet)
7 F Polyethylene catheter in right ureter
7 F. Polyethylene catheter in left ureter
14 F soft rubber catheter in newly made bladder

Fig. 1.—*1*, sagittal section showing relation of the new bladder (rectosigmoid) and the new rectum (proximal sigmoid). The orifice of the latter is immediately anterior to the original anus, now the urinary outlet. The external sphincter ani muscle provides both fecal and urinary control, with voluntary elimination. Total cystectomy has been performed because of carcinoma. *2*, appearance of perineum at completion of operation.

Control of urine by the anal sphincter was excellent within two weeks.

We proposed to divert the urinary stream in such a manner as to offer the following advantages, one or more of which we find lacking in all other present-day methods:

1. Continence of feces, with voluntary control.
2. Continence of urine, with voluntary control.
3. Separation of fecal and urinary streams (with provision of a sterile reservoir for urine).
4. No regurgitation of urine to higher, more absorptive segments of the colon.
5. No artificial orifice in an unnatural site.
6. Conditions that permit cystectomy, if indicated.
7. A distensible artificial bladder amenable to cystoscopic examination.

In an attempt to meet each of these criteria, an operative procedure was devised and developed through cadaver study, in which an artificial bladder is made of the rectosigmoid and a new rectum is constructed for the fecal stream by drawing the proximal sigmoid under the intact external sphincter ani muscle. In this way continence of feces and urine, with voluntary control, is maintained through function of the external sphincter ani. The lower portion of the rectum and the distal portion of the sigmoid constitute the new bladder. Reabsorption here is minimal, and regurgitation to higher segments of the colon cannot occur. The fecal and urinary streams are entirely separate, and the new bladder reservoir is sterile. The orifice for the fecal stream (new rectum) is directly anterior to the original anus (orifice of the new bladder). The patient, therefore, feels free of unnatural orifices; indeed, he may be viewed in the nude without detection of an artificial fecal opening. The new bladder is a closed and distensible viscus and may be cystoscopically examined without danger.

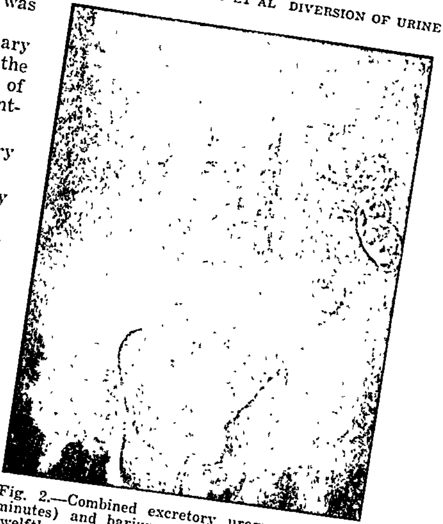

Fig. 2.—Combined excretory urogram (twenty minutes) and barium enema roentgenogram on twelfth postoperative day. Urogram shows normal function bilaterally and no hydronephrosis. Left ureter outlined from renal pelvis to its entrance into the new bladder; right ureter not visualized in this film; artificial bladder, outlined by radiopaque material, extends from above the symphysis pubis to overlie the sacrum. A small amount of barium, introduced into the new rectum, defines but does not obscure its relation to the artificial bladder posteriorly. Note considerable redundancy remaining in the splenic flexure. The barium column ends abruptly at the sphincter ani muscle, which exercises perfect control over both the artificial bladder and the new rectum.

Description of Operation. — *Preoperative Preparation:* A routine of preoperative preparation of the bowel with neomycin and sulfathaladine, as described by Poth, is used. A sterile lower tract is of the utmost importance for the success of the procedure. The fact that sterile cultures are obtained after preparation with these drugs permits a complete change in attitude with regard to the technic of ureterosigmoidostomy in this operation. Fear of opening the intestine during ureterosigmoidostomy is justified when inadequate sterilization and eventual mixing of the fecal and urinary streams ma

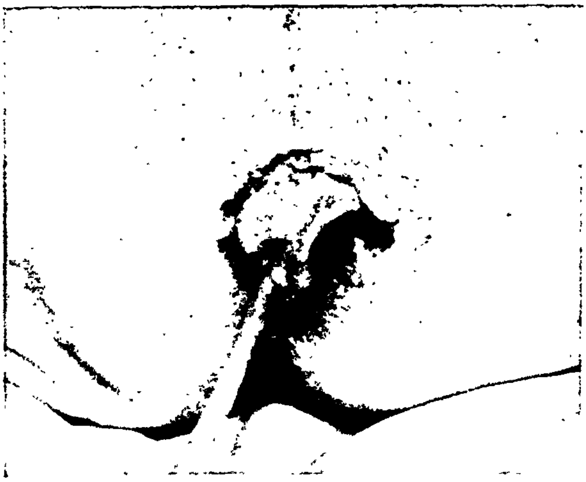

Fig. 3.—Appearance of the perineum on twelfth postoperative day. Redundant mucosa of the new rectum has been drawn into the perineal wound, to prevent possible postoperative retraction. This can easily be resected later, if desired. Catheter in new bladder, the outlet of which (original anus) is hidden under redundant mucosa of new rectum.

tamination a real danger. In the present procedure, however, there is a sterile reservoir, never to be contaminated with feces; consequently, we are justified in performing an open ureterocystostomy, with the emphasis upon good approximation of mucosa to mucosa and a long-term view of avoiding strictures, rather than the immediate concern of contamination.

Technic of Operation: A wide transverse incision is made in the lower part of the abdomen. The peritoneum is opened. Both ureters are isolated and transected as far down as possible. Polyethylene ureteral catheters (No. 7-F.) are inserted to both kidney pelves, and urine is drained from the wound.

After determination of the point at which both ureters easily reach the rectum, the rectosigmoid is transected as far distal as possible. The wound is protected around the rectum, and the intestinal clamp is removed, which opens the lumen. All neomycin solution is carefully removed by suction, to prevent spillage.

A sharp-nosed clamp is introduced into the rectum (new bladder) and pushed through the rectal wall, making an opening the size of the ureter. Each ureter is transplanted by grasping the polyethylene catheter with the clamp and pulling it into the lumen and then passing it downward toward the anus. A simple mucosa-to-mucosa approximation of ureter to rectum is carried out over the catheter with atraumatic No. 000 chromic catgut. (Indwelling polyethylene catheters are considered important to insure patency, temporarily divert urine from the suture line, and prevent reflux.) This procedure allows both ureters to be transplanted quickly to any point of the rectum, with very little exposure. The new bladder (rectosigmoid) is then closed with a triple layer of No. 000 chromic catgut.

Preparation of the proximal portion of the sigmoid, to permit its passage through the perineum, is next carried out. The technic of Swenson in transecting sigmoidal arterial branches, leaving arcuates for collateral circulation, is of great aid here. Our own cadaver work showed ample redundant sigmoid to be drawn into the perineal incision, but the mesentery proved inadequate. The sigmoidal arteries may be transected and still leave a vital sigmoid. After dissection has separated the mesenteric attachments that prevent descent into the perineum, the proximal end of the sigmoid is temporarily closed with a continuous suture, to avoid spillage. For further mobility, the ascending colon may have to be freed by dissecting the parietal peritoneum.

At this point a total cystectomy may be performed if indicated; or this may be delayed until after perineal dissection, when the prostate and the vesical neck may be freed from below. With the peritoneum opened and the intestines protected, it is advantageous to perform the cystectomy in one operation if possible.

The peritoneum is incised between the bladder and the rectum. It is through this incision that the proximal end of the colon will be drawn.

The abdominal wound is protected, with an assistant remaining above, and the patient is placed in the lithotomy position (as for perineal prostatectomy). A semicircular incision is made 1 cm. anterior to the rectum. The rectum and anus are retracted posteriorly and the dissection carried under the external sphincter ani muscle, which may be clearly seen and protected. At this point it is better that the operator keep a finger in the rectum. The operator passes a clamp under the external sphincter ani through the rectovesical space and grasps the stay sutures on the proximal end of the sigmoid, pulling the sigmoid downward into the incision. A drain is also pulled through and out the perineal wound, to drain any possible reflux from the ureterosigmoidostomy. The proximal end of the sigmoid should protrude at least 1 cm. beyond the wound margin, and is fixed to the wound edge. The temporary suture closing this new rectum may be opened immediately after closure of the perineal wound around it.

The operating surgeon pulls the polyethylene catheters out of the rectum with the fingers. While he is doing this, it is advisable for the assistant above to hold the ureters near the anastomosis, to prevent the catheters from being pulled beyond the line of anastomosis. A No. 14-F. soft rubber catheter is introduced into the anus (new urinary bladder) and sutured in place. The ureteral catheters are tied to the rubber catheter.

The patient is again placed in the supine position. If cystectomy has not yet been performed, it may be done at this stage, aided partially by the perineal dissection. If cystectomy has been completed or is not indicated, the wound is closed in layers.

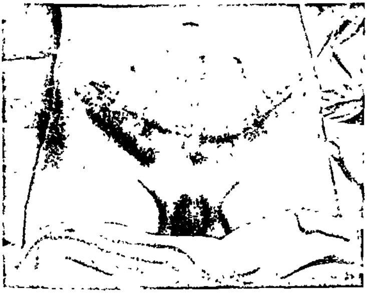

Fig. 4.—Appearance of the abdomen on the twelfth postoperative day, showing absence of ureterostomy or colostomy.

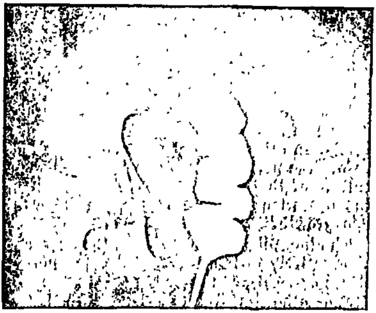

Fig. 5.—Cystogram of the new bladder on the twelfth postoperative day. Note absence of reflux up the ureters.

REPORT OF A CASE

E. K., a white man aged 59, was admitted to St. Clare's Hospital on June 6, 1953, complaining chiefly of painless gross hematuria of three months' duration.

Cystoscopic examination revealed a sessile tumor overlying the trigone and the left ureteral orifice. Retrograde pyelographic studies could not, therefore, be performed. Excretory urographic investigation showed good function of both kidneys, with only a mild degree of hydronephrosis on the left side.

In view of the proximity of the tumor to the ureteral orifice and its location on the trigone, it was decided that total cystectomy would provide this patient with the best chance of permanent cure.

Blood chemistry studies, including determination of the levels of urea nitrogen, chlorides, potassium, and sodium, were made for future reference. All gave results within normal limits.

The patient was prepared for operation with a nonresidue diet and 10 Gm. of sulfathaladine daily, in divided doses, for seven days. Colonic irrigations (until clear returns were obtained) were given for three days prior to the operation. During the twenty-four hours preceding the operation, 4 doses of neomycin (1 Gm. each) were given at six-hour intervals. On the morning of the operation, after colonic irrigation, 1,000 cc. of 1 per cent neomycin solution was instilled into the rectum.

On July 3 operation was performed as aforedescribed, with the patient under spinal anesthesia. In this case, total cystectomy was done before the perineal dissection was started. A culture of the rectal lumen was taken during the operation and was reported as showing "no growth."

The immediate recovery from the operation was entirely satisfactory. There was no evidence of sepsis, and after the third postoperative day the temperature became normal. The output of urine from each kidney was observed to be excellent from the first postoperative day. Gentle irrigations of the new rectum, with a No. 24-F. soft rubber catheter, were carried out daily. A culture of urine from the artificial bladder on the fourth postoperative day was sterile.

On the seventh postoperative day all tubes were removed from the artificial bladder. For three days thereafter the patient had slight difficulty in retaining urine and would lose a few drops while ambulatory. Voluntary evacuations of stool started on the seventh postoperative day, and a regular diet was prescribed, with a small amount of mineral oil daily. As time progressed, voluntary control of both urine and feces steadily improved. At the end of three weeks the patient was having two voluntary bowel movements daily and three voluntary evacuations of urine. On some occasions urine and feces were voluntarily evacuated at the same time. Digital examination of the new rectum gave the sensation of palpating a normal anus. On command, the patient could voluntarily constrict the sphincter ani muscle around the examining finger.

Both incisions healed primarily and without infection.

One month after the operation, this patient presented a picture of perfect continence, with voluntary evacuation of feces and urine, and was eager to resume his work.

SUMMARY AND CONCLUSIONS

A new operation to divert the urinary stream, with voluntary control of feces and urine, is described (with a case report). An artificial bladder is made of the rectosigmoid, in which reabsorption of toxins has been demonstrated to be minimal; and a new rectum is created for the fecal stream by drawing the proximal portion of the sigmoid under the intact external sphincter ani muscle, the orifice for the new rectum being immediately anterior to the original anus (orifice of the new bladder). The external sphincter is, therefore, utilized to provide both fecal and urinary control, with voluntary elimination.

It is hoped that further experience with this operation, which leaves the patient continent, will reduce the understandable hesitancy on the part of surgeons to divert the urine, when indicated, in a multitude of conditions. In the specific condition of malignant disease of the bladder it is hoped that an attitude of early complete extirpation will be encouraged, rather than a tendency to depend upon temporary measures dictated by the fear of producing an incontinent patient.

From the patient's viewpoint the advantages of the operation are obvious. To the patient in the case presented here, the ability to exercise voluntary control over both feces and urine, and the absence of an unnatural abdominal orifice, have proved of inestimable value in restoring him to a happy and profitable existence, with a good prognosis for longevity.

RESUMO E CONCLUSOES

Uma nova intervenção para desvio do tráte urinarie, observando-se um contróle voluntario das fezes e da urina é preconizade e descrito pelos autôres, com apresentação de um caso por êles observado e tratado.

Uma bexiga artificial é feita às expensas do réto-sigmoide, na qual a absorção de toxinas se revelou minima; um novo réto é conseguido para a saida das fézes, mediante a inserção da porção proximal da alsa sigmoide no esfincter anal externo, conservado intáto, ficando o orificie do novo réte imediatamente para diante do anus original. O esfincter externo, é, todavia, usado, tanto para controle das fezes

como da urina, sendo a eliminação de ambas voluntaria.

Esperam os autôres que uma maior experiencia com o processo por êles usado e aqui preconizado, possam fornecer ânimo aos cirurgiões que ainda hesitam na pratica de desvio de tráto urinario, especialmente nos casos de afecção maligna da bexiga.

Sob o ponto de vista do doente as vantagens da intervenção aqui proposta são evidentes e múltiplas, especialmente em face às técnicas anteriormente usadas.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Es wird eine neue Operation zur Umleitung des Harnstroms mit Erhaltung der willkürlichen Regulierung von Stuhl-und Urinausscheidung (mit Bericht eines Krankheitsfalles) beschrieben. Eine künstliche Blase wird aus dem Rektosigmoid, wo die Rückabsorption von Toxinen sich als minimal herausgestellt hat, gebildet; ein neuer Mastdarm zur Aufnahme des Kotstroms wird geschaffen, indem der proximale Abschnitt des Sigmoids unter den intakten äusseren Schliessmuskel des Afters gezogen wird, sodass die Oeffnung des neuen Mastdarms unmittelbar vor den ursprünglichen After, nunmehr Oeffnung für die neue Blase, zu liegen kommt. Der äussere Schliessmuskel wird also für die willkürliche Regulierung der Stuhl-sowohl als auch Harnausscheidung benutzt. Es ist zu hoffen, dass weitere Erfahrungen mit dieser Operation, die die Kontinenz des Patienten erhält, die verständlichen Hemmungen des Chirurgen vermindern werden, eine Umleitung des Harnabflusses, die in einer grossen Anzahl von Erkrankungen indiziert ist, vorzunehmen. Im besonderen Falle der bösartigen Blasenerkrankung wird der Chirurg hoffentlich zu einer frühzeitigen radikalen Operation ermutigt werden, statt sich auf vorübergehende Hilfsmittel zu verlassen, deren Anwendung auf der Furcht beruht, eine Inkontinenz des Kranken zu verursachen.

Vom Standpunkt des Kranken aus liegen die Vorzüge der Operation auf der Hand. Im Falle des hier vorgestellten Kranken hat sich die Moglichkeit willkurlicher Regelung der Stuhl-und Harnausscheidung, sowie die Vermeidung aussernaturlicher Oeffnungen in der Bauchdecke von unschätzbarem Wert fur die Wiederherstellung von glucklichen und nützlichen Lebensbedingungen mit guter Aussicht fur die Lebensdauer erwiesen

RESUMEN Y CONCLUSIONES

Se describe, comunicandose un caso, una nueva operación para desviar la orina, con control voluntario de heces y orina. Del rectosigmoide se hace una vejiga artificial, en la cual se ha demostrado una mínima reabsorción de toxinas; se crea un nuevo recto para las heces llevando la porción proximal del sigmoide al esfínter externo del ano, estando el orificio del ano nuevo inmediatamente anterior al ano originial (orificio de la vejiga nueva). Por consiguiente, el esfínter externo es utilizado para proveer control fecal y urinario con eliminación voluntaria.

Se tiene esperanza que experiencias posteriores con esta operación, que deja al paciente continente, reducirá la comprensible duda del cirujano de desviar la orina cuando este indicado en una multitud de condiciones. En la condición específica de una enfermedad malifina de la vejiga se tiene la esperanza de que una actitud de extirpación temprana completa será estimulada, en lugar de una tendencia a depender de medidas temporales dictadas por el miedo de producir una incontinencia.

Para el punto de vista del paciente las ventajas son obvias. Para el paciente del caso presentado aquí la capacidad de ejercer control voluntario sobre heces y arina y la ausencia de un orificio abdominal a tinatural, han probado ser de valor ines mable para restaurarlo a una existe útil y felix con un buen pronóstico longevidad.

RÉSUMÉ

L'auteur rapporte une technique nouvelle pour la dérivation urinaire avec contrôle des urines et des selles. L'auteur se sert du recto-sigmoide pour faire une nouvelle vessie, de même un autre rectum est aménagé à l'aide de la portion proximale du sigmoide attiré sous le sphincter externe de l'anus. Ce nouvel anus est antérieur à l'autre qui sert d'orifice à la nouvelle vessie. De la sorte, le sphincter externe contrôle l'élimination des urines et des selles. Cette nouvelle intervention devrait être d'un grand aide pour le chirurgien déjà hésitant à pratiquer ce genre d'ilntervention.

Pour les cas de tumeurs malignes, cette technique encouragera le chirurgien à une extirpation plus radicale plutôt qu'à se cantonner dans des mesures amenant la plupart du temps de l'incontinence au patient. Tous les avantages sont du côte du malade. Dans le cas rapporté, le patient pouvait volontairement contrôler ses selles et ses urines. Et le fait de n'avoir aucune ouverture anormale était d'un grand réconfort pour l'opéré.

CONCLUSIONI RIASSUNTIVE

Viene descritto un nuovo tipo di intervento che ha lo scopo di deviare l'urina, con controllo volontario dell'emissione di essa e delle feci. Il metodo è stato attuato in un caso: viene fatta una vescica artificiale mediante il rettosigma; in esso, come è noto, il riassorbimento di tossine è minimo. Viene quindi creato un nuovo retto per la espulsione delle feci abbassando il sigma prossimale al di sotto dello sfintere esterno e creandogli un orificio immediatamente al davanti dell'ano naturale. Quest'ultimo rappresenta l'orificio della neo-vescica. Lo sfintere esterno viene utilizzato per il controllo e l'espulsione volontaria così delle feci come delle urine.

Si spera che questo intervento, ulteriormente collaudato, potrà vincere l'esitazione di molti chirurghi a deviare le urine quando necessario. Nel caso di cancro vescicale, è sperabile che questo intervento possa rendere più frequente la cura radicale, eliminando il timore dell'incontinenza vescicale.

Dal punto di vista del paziente i vantaggi sono indubitabili. Nel malato presentato è possibile l'esercizio della funzione sfinterica tanto per le feci che per le urine, con grande soddisfazione e prognosi favorevole a lunga scadenza.

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Femoral Osteotomy in the Treatment of Marie-Strumpell's Disease

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MARIE-Strümpell's disease is probably a form of infectious arthritis involving principally the small joints and ligaments of the vertebral column, the sacroiliac, the hip and occasionally the shoulder joints. In the early phases of the disease the patient complains of a "lame back" or occasionally of "sciatica." Later, as the disease becomes more widespread, actual limitation of motion and ultimately ankylosis of the spine, shoulders and hips may result. While ankylosis of the shoulders is relatively infrequent, ankylosis of the hips and the spine must be regarded as a commonplace occurrence.

In the acute phase of the disease the patient is racked by such excruciating pain that he welcomes the relief that even ankylosis of the involved joint offers. On the other hand, once the ankylosis has occurred he is not only excluded from participation in normal activities, he may even be hampered in the exercise of the most elemental human functions. In either circumstance his condition is pitiable and warrants the most strenuous efforts at amelioration.

Basically, the final therapeutic answer must be sought in a solution of the general problem of arthritis. While gold, climate, physiotherapy, roentgentherapy, the more recently described compound E or any combination of the measures hitherto suggested may lead to some improvement, no definitive cure for the condition is yet known. Despite the most strenuous efforts, the disease frequently progresses until it has "burnt itself out," in which a "vicious attitude" may develop and surgical intervention must be directed to correction of the deformity as well as to restoration of function.

If ankylosis occurs with the hip and spine extended, the patient is converted into a bony mass extending from occiupt to knee which prevents his sitting down in a normal manner. If, on the contrary, the ankylosis occurs with the spine or hip flexed, he is unable to assume the erect position. He walks about as if he were in truth carrying the weight of the world upon his shoulders and can look the world in the eye only when seated. This contraction in his field of activities is so intolerable that he presses for a solution of his problem. Clinically this problem presents itself under two aspects: (a) that due to an ankylosing arthritis of the hips and (b) that due to deformity caused by flexion of hip or spine.

A. *Arthritis Causing Ankylosis of the Hips.*—With respect to arthritis of the hips, the problem is complicated by the likelihood of bilateral involvement. Because the difficulty arises from such interarticular changes as articular incongruence or destruction, osteotomy alone is quite valueless and arthrodesis would seem to be specifically contraindicated. On the contrary, some form of joint release would appear to be the method of choice. Many different types of arthroplasty have been devised, but, whatever benefits they may offer to patients with the common type of arthritis, they are admittedly least successful in the treatment of Marie-Strümpell's disease.

Because of this, it seemed justifiable to submit to new trial a method which was

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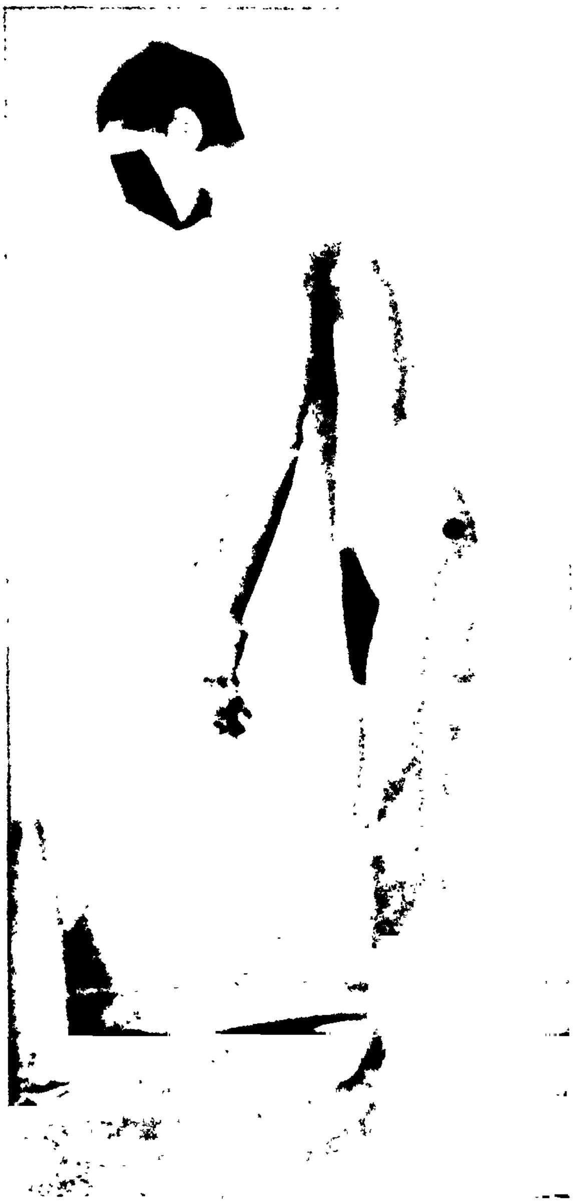

Fig. 1 (Case 1).—J. L. before operation. The patient was completely rigid owing to ankylosis of spine and hip. Unable to sit down. (Reproduced from Osteotomy of the Long Bones, 1947).

originally employed in 1933 and presented in a preliminary report in 1943.[1] Though the method may be considered unanatomic, the primary criterion of a successful hip release is simply the restoration of relatively painless mobility without sacrifice of fundamental stability.

The resection angulation operation, elsewhere described, involves two main steps: (a) resection of the femoral head and neck to reestablish mobility; and (b) abduction osteotomy to restore stability.

First performed in 1933 as a two-stage operation,[1] it is now completed in a single session and permits ambulation after three weeks. Though a plaster of paris spica was employed in the case here presented, its use is definitely contraindicated and is not now used, since it retards the early flexion which is an essential part of the postoperative treatment.

Case 1 (previously reported in "Osteotomy of the Long Bones," 1947).—Joseph L., aged 28, married, first presented himself for examination in March 1946. His illness extended back eight years to 1938, when he first noted pain in the buttocks and in the back. At the outset a diagnosis of "bursitis," presumably "peritrochanteric bursitis," was made, and the patient was given the usual forms of physiotherapy. This proved to be of no avail, and in the following year he visited a large midwestern clinic, where the diagnosis of Marie-Strumpell's disease was definitely established.

He was subsequently treated by means of hormones, Vitamin D and physiotherapy, but without any degree of success. In the following year he was fitted with a plaster of paris corset and later with a Taylor brace. Because of the persistence of the symptoms he was given roentgentherapy to the spine, but this also without immediate relief. In time, however, the pain in the spine subsided, and no increase in deformity has since been noted.

In 1943 the patient began to notice increasing pain and stiffness in the hips, especially on the left side. A short plaster of paris spica was applied and left on for nine months. This resulted in subsidence of the pain, but when the plaster was removed the hip was completely stiff. Since that time the patient has been unable to ascend the stairs, sit down or even take care of his personal needs in a normal manner.

The reason for this soon became apparent. The patient, obviously asthenic and chronically ill, walked with the aid of two crutches. His body was flexed forward about 20 degrees and was completely rigid from the neck to the left knee (Fig. 1). Walking was impossible without crutches, and the patient was able to assume the seated position only with great difficulty, and with assistance. He had to sit on the right buttock with the left thigh pointing straight down and the left knee flexed under him at a right angle.

He had to be lifted onto the examining table. Motion of the toes, ankles and knees was quite normal. There was marked impairment of function at the hips. On the left side there was no motion whatsoever. The hip was fixed in 10 degrees of adduction, 5 degrees of external rotation and 20 degrees of flexion. The right hip showed a marked reduction of both internal and external rotation. Abduction was limited to about 30 degrees, but flexion and extension were characteristically well preserved.

The roentgenogram (Fig. 2A) presented the typical appearance of a "bamboo" spine. Both hips showed marginal lipping of the acetabulum with some narrowing of the joint space. On the left side there was in addition a definite deformation of the femoral head and evidence of bony obliteration of the joint space. Though the pain in the left hip had been brought under control by immobilization and the resultant spontaneous fusion, the concomittance of ankylosis in the hip annd the lumbosacral areas of the spine rendered the patient's condition deplorable. Taken in conjunction with the likelihood of progressive involvement of the right hip, release of the left hip in response to the patient's complaints seemed urgently indicated.

Because of the difficulties previously encountered in the two-stage bifurcation operations, it was decided to attempt the whole procedure at a single session. In anticipation, the site of osteotomy after resection of the head was carefully determined and a Blount nail angulated so that the desired degree of abduction of the distal fragment could be quickly obtained (postosteotomy angle[3]).

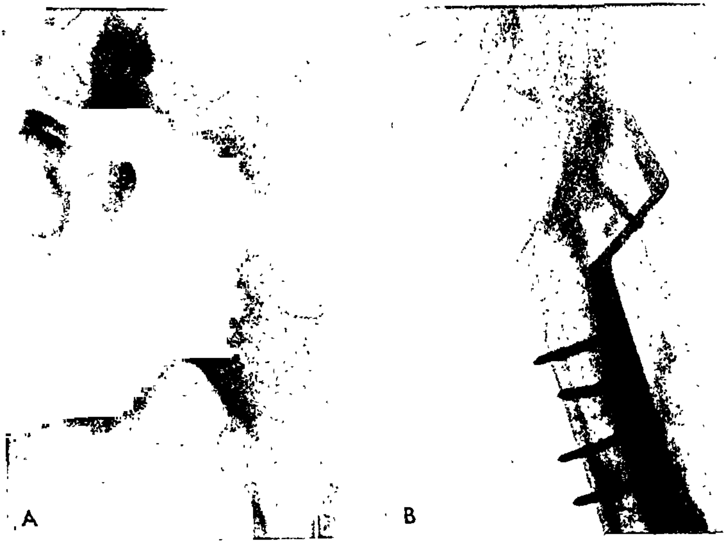

Fig. 2.—*A*, preoperative roentgenogram of left hip (loc. cit.). *B*, postoperative roentgenogram. The head and neck of the femur have been resected and stability restored by angulation osteotomy (loc. cit.).

Smith-Petersen, is followed after the lapse of several weeks by a transabdominal operation in which the firmly ossified anterior vertebral ligament is cut, the intervertebral disc removed and the hiatus between the extended vertebra bodies filled with bone grafts to maintain the correction. A somewhat similar procedure has been described by Herbert.[10]

Each of these procedures has been performed successfully. All the authors, however, insist upon the gravity of the operative *intervention, and there are undoubtedly* instances in which even the contemplation of such radical measures is not justified. In such instances it is still possible to effect operative correction by extension osteotomy of the femur. Whether the deformity is due to flexion of the spine with respect to the extremities or vice versa, the erect position of the trunk is necessarily associated with a flexed *position of the limbs with respect to the* trunk. Since extension of the thighs is limited by the action of the iliopsoas muscle and the capsular ligament of Bigelow, it is evident that the thighs must be brought into line with the trunk. The diminished acromiofemoral angle can be enlarged by extending the thighs below the attachment of the capsular structures by means of a subtrochanteric extension *osteotomy.*[11] *The result is not always* esthetic, but it has the merit of being simple and capable of application in almost all cases. It places the distal portion of the femur in the standing position while the proximal end of the femur still retains its sitting position. When the patient is seated, the distal end of the femur assumes a normal sitting position, while the proximal end goes into extreme flexion. It has been employed in other cases of stubborn hip flexion, and its application to Marie-Strümpell's disease of the spine is illustrated in the following case:

Fig. 4 (Case 2).—H. A. before operation. The trunk can be held only partly erect even when the knees are flexed. (Reproduced from Bull. Hosp. for Joint Dis. 10:64, 1948).

Case 2 (previously reported).[11]—Henry A., a negro aged 41, was first seen in April 1947. At that time he stated that progressive pain and forward curvature of the spine had been present since he was 14 years old. The patient walked facing downward and was unable to look straight ahead except in the seated position.

From the head to the pelvis the patient's body was bent forward in a long C-shaped curve (Fig. 4). The neck could not be rotated and was flexed to about 40 degrees. The trunk was tilted forward about 45 degrees, the dorsal kyphosis being exaggerated and the lumbar lordosis being completely absent. The acromiofemoral angle measured 125 degrees, but there was no deviation from the normal (50 degrees) in the pelvifemoral angles. The right hip could be extended to 180 degrees and flexed to 40 degrees. There was, however, some limitation of rotation and abduction. The left hip could be extended to 180 degrees and flexed to 30 degrees, presenting normal rotation, abduction and adduction. The roentgenogram revealed firm bony ankylosis of the dorsolumbar portion of the spine, with calcification of the anterior vertebral ligament and obliteration of the intervertebral joints. Both sacroiliac joints were fused, and there were early signs of osteoarthritis of the right hip joint.

Despite the evidence of beginning arthritis in the right hip, there was no limitation of extension, and it was the impression that the flexion deformity was entirely due to involvement of the spine. Because of the firm union in the anterior body segments as well as in the neural arch, the outlook for osteotomy of the spine did not appear particularly encouraging, and it was decided to perform bilateral extension osteotomies.

Operation was performed on May 15, with the patient under general anesthesia. He was placed on the operating table so that a line from the acromion to the tip of the trochanter was parallel to the table. Pillows were placed beneath the pelvis and the neck. To maintain this position, the legs, which projected upward at about 60 degrees, had to be suspended by overhead traction. The subtrochanteric regions on both sides were then prepared for operation. Longitudinal incisions were made on either side, and the upper ends of the femurs at the level of the lesser trochanters were exposed subperiosteally. Drill holes were then made along a curved line, and the femurs were transected. Without losing bony contact, the legs were then carefully released and brought into alignment with the trunk. Both fragments were fixed with Blount nails, and the wounds were closed. A double plaster of paris spica was applied.

On July 1 the spica was removed and physiotherapy was instituted. (Since a new type of extension blade plate has been used, plaster of paris has been completely abandoned[12]). Within ten days the patient was permitted out of bed in a chair, and on July 22 walking with crutches was permitted. The patient made steady and rapid improvement, so that by the middle of September he was able to walk without any support. Though he presents a marked "sway back" with a definite anterior deformity of the femurs, the patient is very well pleased with his ability to look the world straight in the eye (Fig. 5).

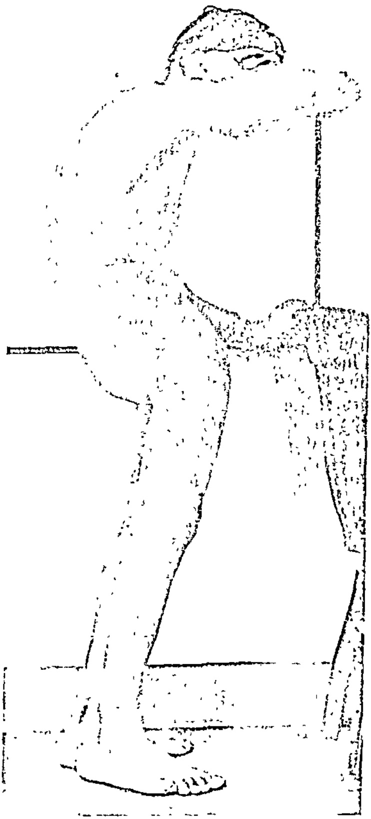

Fig. 5 (Case 2).—H. A. after hyperextension osteotomy. The upper portion of the thigh is in the flexed position; the lower portion is extended. The pelvis is in the seated position, and the femora are in the erect position (loc. cit.).

The main objection to this procedure is

the somewhat unesthetic appearance of the body contour as seen from the side. Although both trunk and extremities are relatively upright, the axis of the back does not lie in the axis of the extremities. This gives the appearance of a sway back and entails an easily accomplished muscle reeducation to maintain balance. It is, however, a relatively innocuous method of reestablishing the upright position without danger of hyperextension injury to the spinal cord.

In each of these cases an entirely different principle of therapy and an entirely different type of osteotomy was employed. The problem in the first case was twofold — first, restoration of mobility, and second, preservation of stability. Since forward motion is predicated upon an alternating unilateral stance, with lateral tilting of the pelvis, it is apparent that stability must be assured in the coronal plane. As the weight is placed upon the surgically treated limb the pelvis tilts downward on this side. Before the opposite leg can be elevated to begin the forward progression, the trunk must be adequately stabilized on the treated limb. For this reason the abduction osteotomy is employed.

Problems like that in the second case are essentially directional. The spine or the thigh, as the case may be, is flexed in the sagittal plane, so that the normal alternation of flexion and extension in the sagittal plane is prevented. Since flexion contracture of the hip, whether real or apparent, must be viewed as only a limitation of extension, it is clear that the objective of the treatment must be restoration of the extension that has been limited by the flexion contracture. Correction must be undertaken in the opposite sense to the deformity and, if possible, should be as near as possible to the site of the deformity. Directly or indirectly, the location of the proximate cause of the deformity is in the region of the junction of the neck and the shaft of the femur. Osteotomy performed at this level but in the sagittal plane may be called hyperextension osteotomy. Though this procedure is not anatomic in the sense that spinal osteotomy is, it has the merit of being easily performed and does not present the danger of complications or of death.

SUMMARY

In patients with Marie-Strümpell's disease two different types of disability are present: (1) ankylosis of the hip and (2) flexion deformity of the hips or of the spine. The former condition can be treated by means of the resection angulation operation—a functional type of arthroplasty or pelvic release employing an abduction type of subtrochanteric osteotomy. The latter hyperextension condition can be corrected by a hyperextension type of subtrochanteric osteotomy to restore alignment of the trunk with the lower extremities.

RIASSUNTO

Nella malattia di Marie-Strumpell vi sono due tipi di inabilità: quella per anchilosi dell'anca e quella per deformità di flessione dell'anca o della colonna. La prima può essere curata permezzo di un intervento di resezione-angolazione, specie di artroplastica funzionale che si giova di una osteotomia subtrocanterica. La seconda può essere corretta mediante un'osteotomia subtrocanterica in iperestensione che consente l'allineamento del tronco con le stremità.

RESUMO

Na doença de Marie-Strumpell vámos encontrar dois tipos de incapacidade: 1) ancilose do quadril; 2) flexão deformante do quadril ou da coluna vertebral.

Discute o autôr a forma de tratamento e correção de tais deformidades, tecendo considerações em casa caso em particular.

RÉSUMÉ

Deux types d'incapicité se rencontrent

dans le syndrome Marie-Strumpell à savoir: 1° l'ankylose de la hanche, 2° une difformité des hanches ou une scoliose.

L'ankylose peut se corriger par une arthroplastie en se servant du type d'ostéotomie substrochantérienne d'abduction. La seconde difformité se corrige par une ostéotomie substrochantérienne d'hyperextension afin de rétablir la ligne du tronc avec les extrémités inférieures.

RESUMEN

En la enfermedad de Marie-Strumpell se presenta dos tipos de incapacidad: (1) anquilosis de la cadera y (2) deformidad flexionante de las caderas ó de la columna vertebral. La primera puede ser tratada por medio de la operacion resección de la angulación, artroplasía de tipo funcional de liberación pélvica emplenado un tipo abductor de osteotomía subtrocantérea. La última puede ser corregida por osteotomía subtrocantérea de tipo hiperextensión para restaurar el alinieamineto del tronco con las extremidades inferiores.

ZUSAMMENFASSUNG

Bie der Marie- Strümpellschen Erkrankung gibt es zwei verschiedene Formen der Bewegungsbehinderung: (1) die Ankylose des Hüftgelenks und (2) die Beugungsentstellung der Hüften oder der Wirbelsäule. Die erste Form kann mittels einer chirurgischen Winkelungsresektion behandelt werden, einer funktionellen arthroplastischen Operation, die auf dem Wege einer subtrochantären Osteotomie vom Abduktionstyp zur Lösung des Beckens führt. Die zweite Form kann durch eine subtrochantäre Osteotomie vom Hyperextensionstyp behandelt werden, wodurch die Richtungsabweichung zwischen Körperstamm und unteren Extremitaten ausgeglichen wird.

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Foreign Interns and Residents Available

Approved hospitals in the United States and Canada that have openings for interns and residents are requested to communicate with the Secretariat of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

A Systematic Plan for the Early Treatment of Civilian Burns

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A STUDY of the various procedures formerly used at the Winnipeg General Hospital for the treatment of burns shows that the treatment used has varied from person to person and from year to year. As new aspects of the burn problem are studied, new treatments are popularized and one is apt to concentrate on one feature to the exclusion of others, which may be more essential to final recovery. Prompt and proper therapy decides whether the patient will survive for grafting operations later.

The physician has a great advantage if he has at his fingertips a systematic plan of therapy that can be started immediately. Such a plan is now in use at the Winnipeg General Hospital and is described here.

Systematic Procedure for Emergency Therapy.—When a patient with a major burn (over 10 per cent of the body surface on an adult or a child) is admitted, therapy should be carried out quickly in the following order:

1. Have all personnel wear masks. Send for blood or plasma.

2. Make a quick, approximate appraisal of the extent and depth of the burns. Accurate appraisal is done after the emergency work is performed.

3. Establish an intravenous procedure. It is best to insert a 19-gauge needle in one vein and start fluid therapy, then do a cut-down on another vein and insert a polyethylene catheter, 18-gauge.* The plastic catheter must be 6 inches (15 cm.) or more long, and should be securely tied to the vein, the skin, and to the snug-fitting needle that connects it to the intravenous set. It should also be well taped to the skin, since these plastic catheters have been known to enter the circulation and cause fatal endocarditis. The cut-down is best done in the greater saphenous vein in front of the medial malleolus, but any convenient vein will do. The advantage of the plastic tube is that the part need not be immobilized, and the tube, unlike a needle, will not perforate the vein on unrestricted movement. Give saline solution until blood or plasma arrives.

4. Morphine should be used sparingly and given intravenously, rather than subcutaneously, to prevent irregular absorption.

5. When the general condition of the patient is poor or when there is any possibility of carbon monoxide poisoning, give oxygen by nasal catheter. The catheter should be inserted the distance from the nostril to the ear, at a rate of flow of from 4 to 6 liters per minute.

6. Insert a Foley catheter, measure the urine, and leave the catheter *in situ* for hourly measurements.

7. Give an intramuscular injection of 1,000,000 units of penicillin.

8. Make as accurate an appraisal of the depth and extent of the burns as possible. This should be done before dressings are applied.

(a) *Depth of Burns*: Figure 1 illustrates the classification of burns and corelates the depth of the burn with the clinical appearance and the average healing time. Since burns have been classified from time to time into various "degrees," with some resulting confusion, it is suggested that a method in which the name indicates the depth is preferable. Both nomenclatures are used in the diagram. The heal-

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*Manufactured by American Cystoscope Makers Inc., and obtainable through surgical supply houses.

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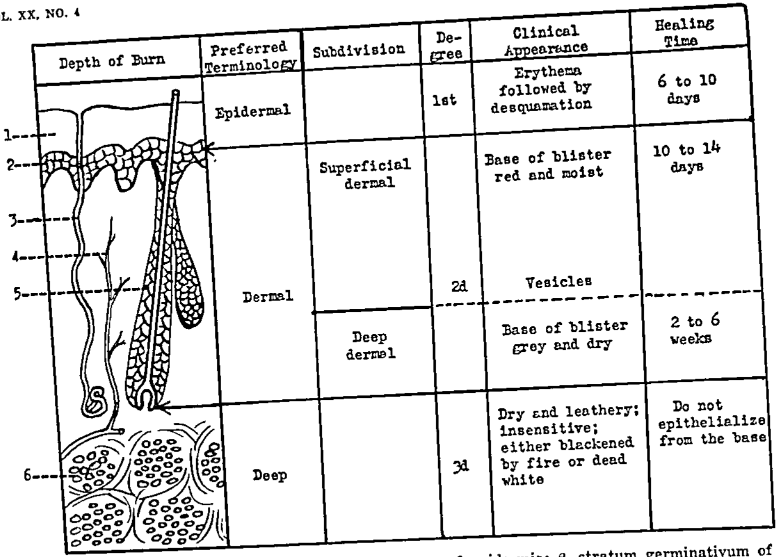

Depth of Burn	Preferred Terminology	Subdivision	Degree	Clinical Appearance	Healing Time
	Epidermal		1st	Erythema followed by desquamation	6 to 10 days
	Dermal	Superficial dermal	2d	Base of blister red and moist	10 to 14 days
				Vesicles	
		Deep dermal		Base of blister grey and dry	2 to 6 weeks
	Deep		3d	Dry and leathery; insensitive; either blackened by fire or dead white	Do not epithelialize from the base

Fig. 1.—Classification of burns. *1*, superficial layers of epidermis; *2*, stratum germinativum of epidermis; *3*, sweat gland; *4*, blood vessel in dermis; *5*, hair follicle with its sebaceous gland, and *6*, subcutaneous fat.

ing times listed are the results of experiments in which skin grafts were cut at various levels and healing periods observed (Converse and Robb-Smith). It is important to note that in dermal burns healing occurs chiefly from the sweat glands and the sebaceous glands of the hair follicles, which provide the necessary epithelial cells.

Burns are always deeper than is thought on initial examination. An area reddened at first may blister later; what appears to be a deep dermal burn may later prove to be a deep full thickness burn. This is particularly difficult to judge. It is best to make one's assessment the maximum and treat the burn accordingly. A useful aid in judging depth is to touch with a weighted needle. If the burn is epidermal, hyperalgesia will result; if dermal, hypoalgesia, and if deep, greatly decreased pain or absence of pain.

(b) *Calculation of Percentage Area Burned*: Without counting erythema (epidermal or first degree burns), proceed as follows:

Shade in the burned areas on the diagrams in Figure 2, thus: Dermal or second degree (partial thickness) burns, shaded black and white; deep or third degree (full thickness) burns, solid black.

Calculate the percentage area burned, using surface area measurements in Figure 2 and in the following table:

Percentages of Areas Affected by Growth

Area	Adult, %	15 yr., %	10 yr., %	5 yr., %	1 yr., %	0 yr., %
A—½ of head	3.5	4.5	5.5	6.5	8.5	9.5
B—½ of one thigh	4.75	4.5	4.25	4.	3.25	2.75
C—½ of one leg	3.5	3.25	3	2.75	2.5	2.5

(c) *Calculat burned*:

FOUNDED BY DR. MAX THOREK

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Section II

Bulletin of Meetings — Announcements
National and International Activities

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for
International Surgeons' Hall of Fame

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Continental Odyssey

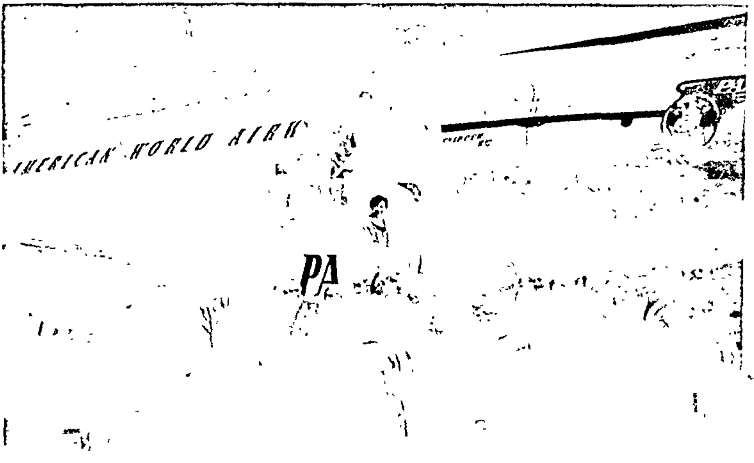
WALTER C. BORNEMEIER, M.D., F.A.C.S., F.I.C.S.

CHICAGO, ILLINOIS

It was a warm summer evening, the second day of June 1953, when we left the International Airport in New York. Soon, from high in the sky we could see all of New York and gradually the shoreline of the New England states. We were on our way. The cities that we expected to visit were Frankfurt, Vienna, Innsbruck, Venice, Rome and Paris. The Austrian Section of the International College of Surgeons was to hold its meeting on June 5, 6 and 7. The meeting of the Italian Section in Rome was to follow on June 11, 12 and 13. Many surgeons from the United States planned to attend both meetings; in fact, part of the group had been in Europe for some time, attending the Coronation in England and seeing the Old World.

About an hour after we were out of New York, far up the coast, we had an excellent dinner. We then went down into the clubroom of the plane for a songfest under the direction of that always ready and willing song leader, Dr. Arnold Jackson. He practically sang us into Gander, Newfoundland.

The Gander Airport was full of GI wives and children, Europe-bound. The children were a well-behaved lot, considering that the hour was about midnight. Dr. Frank Ciancimino, of Nyack N. J., was about to buy me an ice cream cone when our flight was called and we were on our way again. More singing started in the lounge, but it didn't last long; one by one we went to our seats and settled down



Arrival in Vienna, where the American delegation was warmly
Profs. Finsterer, Schönbauer and

for a nap. When we awakened, it was daylight; coffee was ready, and soon after breakfast we were in London. Half an hour later we were again on our way. We had lunch and landed in Frankfurt.

Frankfurt, a clean and busy city, seems intent on reestablishing and rebuilding itself as rapidly as possible. The people are busy; they move briskly, and there is no loitering and visiting on street corners. Workmen near our hotel stayed on the job until dark.

Some of our party, in a visit to the cocktail bar before dinner, learned the hard way that the duty on Scotch and Bourbon makes both a trifle high. Local brews, however, are not expensive.

We stayed in Frankfurt one night, left by plane, stopping in Stuttgart and Munich, and arrived in Vienna in midafternoon after a beautiful flight along the Alps, over fields and towns in a country that is rapidly regaining its place in the economy of Europe.

We were met at the plane by a delegation of Viennese surgeons, headed by Prof. Hans Finsterer and Dr. Mandl. We were required to go through customs and be cleared by four-power inspection of passports and declarations of money brought in, so that no one could leave with more than he brought in. Vienna is in Russian-occupied territory, but the city is under four-power occupation. The airport is out of the city, in Russian territory; so we were put into a bus, accompanied by a local guard, and taken to the city. No stops along the way were permitted. In Vienna itself no one was restricted except from taking pictures of Russian soldiers or of buildings flying the Russian Flag. One of our ladies had to talk fast to get her camera back after taking a picture of a girl in uniform, the Russian equivalent of a WAAC.

The people of Vienna are delightful and very friendly. Because of the difficulty of coming and going, they see relatively few outsiders who have not come on business. We were wined and dined with a sincere cordiality that was truly refreshing.

On the morning of June 5, the meetings started in the old Allgemeines Krankenhaus. In the ancient amphitheater of this institution we listened to surgeons from every part of Europe and the United States. Prof. Schönbauer a Fellow of the College, who is head of the First Surgical Clinic as well as chief of the entire medical center, was our host.

Prof. Finsterer, Honorary Fellow and President of the International College of Surgeons, thoroughly enjoyed the entire meeting, greeting old friends heartily, and was particularly gracious as host as the extracurricular assemblies. Prof. Felix Mandl, Honorary Fellow of the College and Secretary of the meeting, interpreted accurately and rapidly. From the time of our arrival by plane until our departure four days later by train, he was always available to help whenever possible.

The American Medical Society of Vienna, an organization for the assistance of American doctors who wish to study in Vienna, has recently been reactivated. This group, with the Austrian Section of the International College, was host at a cocktail party after the first day's meeting. On the following evening the Bürgermeister of Vienna was host at a similar affair, even more elaborate, in the local City Hall. It was here that we were again able to greet and talk with the surgeons of Vienna and surrounding regions. Incidentally, the hors d'oeuvres were beautiful as well as delicious and were rivaled only by those set before us later in Venice, Rome and Paris, and of course, on the Queen Mary.

After the mayoral party, a banquet was given by the Austrian Section at the Hotel Sacher. The reputation of this hotel for hospitality has not been exaggerated. Dr. Max Thorek gave an inspiring address at the conclusion of the Banquet, expressing the hope of all the visiting surgeons and their wives that Vienna, with all its beauty, charm and graciousness, may soon be free so that men may come and go without restraint.

On Sunday evening, June 7, we left Vienna by train from the new, modern railway station. About two in the morning, at Enis, we were awakened by a Russian soldier who examined our passports and the special "grey card" that permitted us to leave after a special meeting in Vienna. No one had any actual difficulty, but it was a relief when the train again got under way and we knew we were in territory supervised by friendly people.

At about 7 a.m. on Monday we arrived in Innsbruck. Here our cars were to lie over for a few hours, to be picked up by a train for Venice. We went to the Innsbruk Inn for breakfast and then spent several hours in this lovely city, which is cradled among the mountains of Austria, Switzerland, Italy and Germany. Innsbruk is the northern entrance to the Brenner Pass and was the site of the meetings of Hitler and Mussolini.

The ride down the pass on our way to Venice occupied us until several hours past noon. The sun lighted both sides of the pass so that none of its grandeur was hidden, and cameras clicked steadily in an effort to capture particularly striking shots.

At dusk we arrived in Venice. About a block from the railway station we entered gondolas for the trip to the Royal Danieli Hotel. The skill of the gondolier, who can manage his aquatic taxicab with one long flexible oar, is almost unbelievable. He propels, guides, stops or backs up merely by laying the oar into a notch in an upright beam, and carries six passengers along at a very dignified pace.

Tuesday was a beautiful and sunny day in Venice. We spent the morning seeing the sights, moving in and out of buildings on the streets between canals, seeing the

Group of surgeons just outside the Campidoglio in Rome, where the Fourth Congress of the Italian Section was held. Left to right, Drs. Juzbasic, Thorek, Bendandi, Jackson and Horvath.

Ducal Palace, and crossing the Bridge of Sighs to see the prison. We few the pigeons in front of the Basilica of St. Mark and the Campanile. We crossed the Rialto Bridge and ended our morning tour at the City Hospital, where refreshments were served to our entire group.

After lunch we toured the city by gondola, visiting the glass factory and seeing the homes of the famous people of Venice. Our tour ended on the Island of St. George, where the mayor of the city entertained us. A delightful cocktail party, with all the Venetian delicacies served by a host of waiters, was a fitting climax to a lovely day in a lovely city.

Next morning a gondola took us down the Grand Canal in the bright sunshine to the station for an all-day ride across country to Rome.

At the Hotel Excelsior we were soon comfortably settled. Excellent food and a good night's rest prepared us for another big day on the morrow.

On Thursday, June 11, the Congress of the Italian Section of the International College of Surgeons was officially opened in the Campidoglio, where the official welcome was proclaimed by the town mayor. Words of welcome were heard also from several dignitaries, including Prof. Paolucci, who had recently been elected Senator. Drs. Thorek and Jackson responded. After this meeting the President of the Province of Turismo entertained all the participants at a vermouth party at the Casina della Rose, Villa Borghese.

At 4 p.m. on June 11 the scientific sessions were officially opened at the Policlinico Umberto I. in the Hall of Surgical Clinics at the University of Rome. The afternoon of June 11, both forenoon and afternoon of June 12 and 13, were occupied by scientific sessions. Surgical demonstrations were available, and a large number of surgeons gathered to watch Prof. Paolucci and Prof. Valdoni operate.

In the evenings or between the scientific sessions, there was an intensive program of parties and sightseeing. At the end of the first day, which included the opening meeting at the Town Hall, the vermouth party at noon, the opening of the scientific session and the first afternoon of meetings, a huge cocktail party was given by the Director General of Cultural Relations at the Grand Hotel. Every delicacy imaginable was available, and, for those who preferred ice cream or pie, these were available too. The American Ambassador, Clare Booth Luce, was present and participated.

On Friday night, a Banquet at the Rupe Tarpea, with excellent entertainment and dancing, lasted until the early hours of Saturday, and on Saturday night a dinner party was given by SenatorPaolucci at the exclusive Royalty Club, an event never to be forgotten.

On Sunday morning our entire group was escorted to the Vatican. where we were graciously received by Pius XII, The Pope showed warm interest in the mission of the International College of Surgeons.

By noon of Sunday, June 14, we were on our way north through peaceful Italy, where fields of grain replaced the war-torn hills and ammunition dumps that were here nine years ago. As our train passed through Grosetto, a hundred miles north of Rome, it was quite a thrill to look out upon the beautiful Tuberculosis Hospital where, eight years ago, I spent my last month of duty overseas in command of one platoon at a Field Hospital.

On Monday morning we arrived in Paris. What a blow! the shops are closed on Monday. We survived, however, and celebrated by going to the Folies Bergére. And for those of us who had never seen Paris, the Champs Elysees and the Arc de Triomphe were as impressive as our skyscrapers are to visitors to Chicago or New York. On Tuesday we walked and shopped. On Wednesday we saw Paris by bus and on Thursday we visited the castles of Malmaison and Versailles. If the Castle of Versailles could be moved into Grant Park in Chicago, what a convention hall it would make!

During the daytime hours we saw the Cathedral of Notre Dame, the Louvre, the

Basilica of the Sacred Heart, the Church of the Madeleine, and the Opera House. In the evenings we visited Maxim's and Ciro's, and one evening had dinner in the home of Prof. Lucien Leger, F.I.C.S., of the University of Paris, where we also met Prof. Roux in a select company of Fellows of the College.

Paris is fascinating; one day we shall go back. We saw a great deal in four days, but missed the Rive Gauche. Next time we will go there first.

On Friday, June 19, our party divided to go home, either by air or on the Queen Mary. We elected to come home on this floating palace, with its ballroom, breakfast in bed, cocktails on the deck, a nap in the afternoon, movies, dinner, horse racing, dancing and finally hurry to bed because it's about time for breakfast.

We bowed low in salute to the Statue of Liberty at noon on Tuesday, June 23, just three weeks after leaving the International Airport for a glorious trip with charming people to the medical and cultural centers of a very friendly Europe and a sterling group of Fellows of the International College of Surgeons, all of whom were profoundly and unalterably interested in its mission.

* * *

For information pertaining to qualifications for

Fellowship or Associate Membership

in the

Canadian Section, International College of Surgeons

please write

E. M. C. McAmmond, M.D.

Suite 2, 1701 West Broadway

Vancouver 9, B. C., Canada

Vienna, Austria
July 14, 1953

My dear colleague:

It has been a regrettable loss to all physicians to be prevented throughout the years of war from attending gatherings with their colleagues from all over the world, gatherings which, since more than half a century ago, have been recognized beyond any doubt as of great value not only for teaching and research but also for the practice of medicine. On such occasions the stubborn, quiet, and patient labor of scientific medicine is reviewed not by sensational proclamations but by simple reports on the experiences gained in the clinic or in the laboratory with new and sometimes even with old methods.

The International College of Surgeons has made an intensive and continuing study of this need and has left nothing undone that could contribute to its fulfillment, at the same time meeting every requirement of professional and personal excellence . . . It is certainly not made easy for a surgeon to acquire membership; he has to undergo a difficult examination to which he can be admitted only upon the suggestion of prominent colleagues . . . The Austrian Section is comparatively young, but from the very beginning the nucleus of its membership was formed by the leading surgeons of Vienna and prominent representatives of the various surgical specialties . . .

ALEXANDER HARTWICH, M.D., F.I.C.S.

* * *

For information pertaining to qualifications for

Fellowship, Associate Membership or Junior Membership in the

United States Section, International College of Surgeons

please communicate with

Dr. Karl A. Meyer, F.A.C.S., F.I.C.S.
1516 Lake Shore Drive
Chicago 10, Illinois

United States and Canadian Sections

Dr. Herbert Acuff, F.A.C.S., F.I.C.S.

The Herbert Acuff Memorial Meeting was held by the Southeastern Section on April 24 and 25 in Knoxville, Tennessee. The two-day meeting was a tribute to Dr. Herbert Acuff, F.A.C.S., F.I.C.S., the beloved friend and colleague who was President of the United States Section and then President of the College.

Dr. Acuff studied, traveled, and had many friends throughout the world, but his home and practice were in Knoxville. He was born in Washburn, Tennessee, near Knoxville. He interned at Knoxville General Hospital and later was thoracic surgeon on the staff. He was Chief of Staff at St. Mary's Memorial Hospital and Beverly Hills Sanatorium. The citizens of Knoxville are proud of the Acuff Clinic, of which he was President and Surgical Director.

The service was a memorable and moving experience, as it could not fail to be to the many who loved and honored Dr. Acuff. Truly a "good great man" in the highest sense of the words, Dr. Acuff can never be forgotten by any who knew him.

At a banquet that evening at the Cherokee County Club, Dr. Arnold S. Jackson, F.A.C.S., F.I.C.S., President-Elect of the United States Section, addressed the group on current concepts of thyroid surgery.

Dr. George B. Callahan, F.I.C.S., of Waukegan, Illinois, showed slides of previous meetings of the International College of Surgeons throughout the world.

Dr. Park Nicely, F.A.C.S., F.I.C.S., of Knoxville, presided at the program Friday morning. The Mayor of Knoxville, the Hon. George R. Dempster, gave an address of welcome, and Dr. Fred Brown gave the invocation.

The morning scientific session included the following presentations: "Surgical Aspects of Coal Workers' Pneumonoconiosis" by Dr. Harwell Dabbs, Director of the Lynch Medical Services in Kentucky; "The Differential Diagnosis and Treatment of Lesions in the Mediastinum" by Dr. David Boyd, F.A.C.S., F.R.C.S., of the Lahey Clinic in Boston; "Uterine Bleeding, A Universal Problem" by Dr. Gilbert Douglas, F.A.C.S., F.I.C.S., Associate Professor of Gynecology at the Medical College of Alabama and Chairman of the Board of Regents of the United States Section of the International College of Surgeons; "Some Problems in Prostatic Surgery" by Dr. Ullman Reeves, F.I.C.S., Past President of the Southeastern Section of the American Urological Association; and "Precancerous Lesions of the Colon" by Dr. Daugh Smith, F.A.C.S., Associate Professor of Surgery at Vanderbilt University and President of the Tennessee State Medical Association.

Dr. C. L. Chumley, F.A.C.S., F.I.C.S., of Knoxville, presided over the aftern session, at which a panel discussion held on the management of gastro tinal hemorrhage. Dr. B. T. Bea F.I.C.S., Secretary-Treas eastern Surgical Congress, was moderator. Dr. Donald T. Chamberlin, F.A.C.P., Gastroenterologist from the Acuff Clinic in Knoxville, Dr. Jackson, Dr. Boyd, and Dr. Smith were collaborators.

Dr. Edward Compere, F.A.C.S., F.I.C.S., Professor of Orthopedic Surgery at Northwestern University, Chicago, presented a paper entitled "The Neck, Shoulder and Arm Syndrome."

Saturday morning, April 25, Dr. Milton Stockman, F.I.C.S., of Knoxville, presided. Dr. Neal Owens, F.A.C.S., F.I.C.S., Professor of Clinical Surgery at Tulane University addressed the assemblage. His topic was "Surgical Management of Carcinoma of the Head and Neck."

A symposium was held on the current use of radioactive isotopes. The participants, from the Oak Ridge Isotopic Research Hospital, were Dr. Marshall Brucer, moderator, and Drs. Gould Andrews, Granvil Kyker, Samuel Root, Malcolm Tyor, Ralph Kniseley, Charles Crompton, and Robert Higgins, collaborators.

Albee Memorial Lecture

The Second Albee Annual Lecture on Rehabilitation will be delivered at the Kessler Institute for Rehabilitation in West Orange, New Jersey, on October 9. Dr. Sterling Bunnell of San Francisco will speak on the topic "Tendon Surgery of the Hand."

Other aspects of surgery of the hand will be considered in four panel discussions to be held in the afternoon, with the following speakers and subjects: Dr. Edward J. Flynn of Boston, "Acute Hand Injuries"; Dr. Leonard Goldner of Durham, North Carolina, "Reconstruction of the Hand After Cerebral Palsy and Traumatic Spastic Paralysis"; Dr. J. William Littler, of New York, "Phalangization," and Dr. Jerome Gelb, of Newark, "Cineplasty in Children." Several guests have been invited to discuss these presentations. Dr. Herbert Conway, Drs. Emmanuel B. Kaplan and Leo Mayer, and Dr. Thomas W. Stevenson, all of New York City, will discuss the papers of Drs. Flynn, Goldner and Littler respectively. Dr. Henry Kessler, Medical Director of the Kessler Institute for Rehabilitation, will be one of the discussants of Dr. Gelb's paper.

Dr. Albee, a pioneer in orthopedic surgery and a leader in the development of modern rehabilitation, was the first Medical Director of the New Jersey State Rehabilitation Commission. He was famous the world over for his great contributions to orthopedic knowledge. His many friends in the International College of Surgeons will recall the memorial service held in his honor at the College Home in Chicago, during the Seventeenth Annual Congress of the United States and Canadian Sections. At that time the Fred H. Albee Memorial Chair was dedicated to his memory, with appropriate solemnities, as "a visible and tangible memorial designed to suggest the dignity, wisdom, learning and power of the dedicated surgeon."

The Albee Lecture is open annually to all physicians and surgeons. Those who wish to attend this year's Lecture should communicate with the Registrar of the Kessler Institute for Rehabilitation, Pleasant Valley Way, West Orange, New Jersey.

Dr. Crotti Honored at Dedication of Ohio Cancer Center

The career of Dr. André J. Crotti, Past President Emeritus of the International College of Surgeons and founder of the Columbus Free Cancer Clinic more than thirty years ago, was a focal point of interest at the two-day program of dedication for the new Cancer Research Laboratories of the Health Center at Ohio State University.

The $657,000 research center is scheduled for completion in the autumn of this year. The ground floor and the upper four stories of the magnificent modern building will house the headquarters of the Clinic and provide full facilities for research.

The merger, long desired by Dr. Crotti to provide services beyond the resources of the Clinic alone, was hailed with great enthusiasm. "The only way to obtain recognition of the Clinic as a true cancer center," said Dr. Crotti, "was to merge the Clinic with the Medical Center . . . The hope of reducing the morbidity and mortality rates associated with cancer lies in the correlate efforts of first-rank scientists working together in a great center where all needed facilities are available." An official of the Medical Center expressed the opinion that Dr. Crotti's energy and devotion had helped more than any other single contribution to bring it about.

Interviewed by a representative of the **Columbus Dispatch**, Dr. Crotti recalled the early days of cancer detection, diagnosis and therapy in Columbus. "In June 1921, as a young Swiss doctor," he said, "I met Mrs. Samuel L. Black, who joined forces with me to lay plans for the Clinic, establish headquarters for it and set up a Board of Directors. Mrs. Black found two rooms on the second floor of the Tuberculosis Dispensary; the Board of Directors was organized with myself as first Medical Director, and the Clinic opened in October 1921. Miss Mary Scarlett (Later Mrs. Charles Wambaugh) became the first nurse in charge.

"We didn't have anything—not even two chairs—and of course we had no roentgenographic equipment. For several years we relied on the kindness of Columbus physicians, who permitted us to take our films without cost, and on the good will of the hospitals for admission of our patients."

Dr. Crotti then appraised the achievements of the Clinic in service, cancer education and the impetus given to work in this vitally important field. Because of its limited facilities, the Clinic was devoted chiefly to the detection and diagnosis of cancer, referring its patients elsewhere to be treated. In 1946, after twenty-five years of service, Dr. Crotti resigned as Medical Director with two suggestions to the Board: first, that Dr. Charles A. Doan, F.I.C.S. (Hon.), Dean of the College of Medicine of the University of Ohio, succeed him in office, and second, that the Clinic be made part of the University Medical Center. "There is no doubt in my mind," said Dr. Crotti, "that we shall one day control cancer by chemical means. Until that day comes, the installation of great cancer centers offers a magnificent opportunity for progress.

Tributes were paid to Dr. Crotti by Dr. Doan, who presided at the dedication ceremonies; by University President Howard L. Bevis and Vice-President John B. Taylor, by Dr. David E. Price, Assistant Surgeon General of the United States Public Health Service, and by the other speakers on the program: Judge Myron B. Gessaman, President of the Executive Board of the Columbus Cancer Clinic; C. William O'Neill, Attorney General of Ohio, and Judge Robert E. Gorman, Chairman of the University Board of Trustees. Dr. Doan also read a message from Charles P. Kettering, Vice-President of the Board. A

Dr. André Crotti
LL.D., F.A.C.S., F.I.C.S. (Hon.)

sessions of the Congress, programs of unusual interest will be presented. On the afternoon of Monday, September 14, the Herbert Acuff Memorial Lecture will be delivered by Dr. J. Grafton Love, F.A.C.S., F.I.C.S., Professor of Neurosurgery at the University of Minnesota. His subject will be "Newer Methods of Diagnosis and Treatment of Glossopharyneal and Trigeminal Neuralgia, including the Decompression Operation."

The International Surgeons' Hall of Fame will also be the theme of a special program, to be held in the Sert Room of the Waldorf-Astoria at 8 p.m. on Sunday, September 13. The main address, "Fame in Surgery," will be given by Dr. Richard H. Shryock of Baltimore. Dr. Shryock is the William M. Welch Professor of the History of Medicine and Director of the institute of the History of Medicine at the Johns Hopkins University School of Medicine.

The beautiful Convocation ceremonies, always the highest point of every Congress, will take place on Thursday evening in Carnegie Hall. The induction of new members into the United States and Canadian Sections will be, as always, attended by its invariable grace, dignity and fitness.

The wives of the surgeons who attend will be offered every facility for enjoyment. Among the planned diversions are a cruise around Manhattan Island, a tour of the United Nations headquarters, a bus tour of New York, and a luncheon and style show in the Empire Room of the Waldorf-Astoria. Mrs. Fred T. Albee will be hostess at a welcoming tea given in the Empire Room. Mrs. Charles Haight will present a lecture, "The White House Story," after a breakfast at Altman's.

As is well known to those who have attended, each Annual Congress of the United States and Canadian Sections surpasses the one before. It is our confident expectation that this year's Congress will be no exception.

Dr. Morgan Honored

Dr. James O. Morgan, F.A.C.S., F.I.C.S., Regent of the International College of Surgeons for the State of Alabama, has been elected President of the Alabama State Medical Association.

Dr. Morgan has long been one of the most devoted Fellows of the College, and the honor is well deserved. He was graduated from the Emory University College of Medicine in 1916 and served his internship at St. John's General Hospital in Pittsburgh, Pennsylvania. His postgraduate studies included work in Chicago, New York and Vienna. He has been Attending Surgeon at the Holy Name of Jesus Hospital in the town of his residence, Gadsden, Alabama, since 1925. He is a member of the Etowah County Medical Society, the Alabama State Medical Association, the American Medical Association, the American Association of Railway Surgeons, the Southern Medical Association, the Southeastern Surgical Congress, the American College of Surgeons and the International College of Surgeons.

Dr. Morgan is greatly in demand as a speaker on topics in the surgical field and has contributed many fine articles to the literature. Readers of the Journal of the International College of Surgeons are familiar with the excellence of the abstracts he frequently contributes. His colleagues and friends, both within and without the College, will be unanimously delighted to hear of his latest honor.

Surgical Exchange Assistantship Desired

A well-trained German surgeon desires an exchange assistantship in surgery in the United States. For details address: Postgraduate Committee, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Woman's Auxiliary
of the
United States and Canadian Sections

Message from Mrs. Walter C. Burket, President

There are now more than thirteen hundred members of the Woman's Auxiliary which makes it possible for us to undertake an important project this fall. Since this is a service organization, our dues will be used to further the work of the ICS through worthy projects and we have tried to keep expenses at a minimum. Our most vital concern now is choosing the right project to sponsor. Your Board feels that surgical fellowships offer the finest opportunity for vital service at this time, but careful study will be necessary before plans can be made. We hope to have the data ready to present at the business meeting in New York in September.

A word of appreciation goes to Mrs. Chester W. Trowbridge for her work on membership and to Mrs. E. Karley Pinkerton for her achievements in Canada. Mrs. Jerome J. Moses and her committee welcomed the women who came to Chicago during the Regional Meeting May 5-6. Mrs. Louis F. Plzak, treasurer, has sent out membership cards and prepared a roster of members. And always, we are indebted to Mrs. Max Thorek for her wise counsel.

Preparations are now complete for the September 14-18 meeting in New York. On June 9 I met with the women in charge of the plans. Mrs. John J. Goller, chairman of the Ladies' Entertainment Committee, arranged for our meeting at the Columbia University Club and was hostess at a luncheon there, following the business session. Those present were her co-chairman, Mrs. Clifton L. Dance, Mrs. Fred H. Albee, who will be hostess at a tea in the Peacock Lounge of the Waldorf-Astoria on Monday, September 14, Mrs. Henry Scheer, who has charge of the breakfast at Altman's on Wednesday, and Mrs. John Mussio, who is chairman of the luncheon and fashion show at the Waldorf on Thursday. Mrs. Floyd E. Keir, who will have charge of our Tour at the United Nations Buildings on Tuesday was in Europe at the time and could not be with us.

We have arranged for a Hospitality Room at the Waldorf-Astoria, for your convenience and pleasure. Hostesses will be on duty there. Please plan to make it a place to meet old friends and to make new friends. Since our membership is so scattered we cannot hold meetings except during the Annual Congress. In spite of this handicap, we want this to be a friendly organization which can exert real power in this harried world. Let's use our strength to increase good will and to accomplish good.

Mrs. Walter C. Burket

Argentine Section

Dr. Jorge A. Taiana
F.A.C.S., F.I.C.S. (Hon.)

The Executive Committee of the Argentine Section, wishing to extend the opportunities and benefits of College membership to all qualified Argentine surgeons, has set forth the purposes and activities of the Section in an official letter, a copy of which has been sent to every surgeon in Argentina. The substance of the letter, signed by Prof. Dr. Jorge Alberto Taiana, President of the Argentine Section, follows:

"The Argentine Section of the International College of Surgeons is not just another surgical society among the numerous and excellent societies already in existence in our country; it serves a different and a wider purpose. Its function from the beginning has been to achieve better relations with surgeons in other parts of the world as well as to augment surgical progress in our own country.

"We took the greatest pride in holding the Seventh International Congress in Buenos Aires in 1950. This fine assembly permitted our surgeons to share the scientific experiences of almost five thousand surgeons from all over the world, to form new concepts and to make new friends. The discussions and the scientific communications presented have been published in four volumes, comprising more than two thousand pages.

"In addition to the usual activities, Annual Fellowships are awarded which have proved to be immensely valuable. Through an established agreement with the Brazilian Section, three postgraduate fellowships are given annually to our associates in Brazil, while at the same time three Brazilian Fellows are admitted to our hospitals.

"These fellowships afford our associates the opportunity to continue their postgraduate studies in medical centers in Argentina. They also permit the doctors practicing in the interior to study at the special surgical centers in Buenos Aires for a number of months and to observe the technic of outstanding surgeons in the capital.

"Publication of the *Journal of the Argentine Section of the International College of Surgeons* must also be mentioned. This journal, issued every three months, carries abstracts of all surgical work done in the Argentine.

"Our Fellows, travelling in other countries, attend Congresses at which they enjoy the hospitality of other Sections of the College. Their time is spent to good advantage and their knowledge increased.

"The Argentine Section of the International College of Surgeons has approximately 700 members in different parts of the country, and it is hoped that this number will be increased."

Invitation to Combined Congresses

An invitation was received from the Argentine Section of the International College of Surgeons to attend the Second Congress of the Brazilian Section and the first Pan-American Congress of the International College of Surgeons, to be held in Curitiba, Parana, Brazil, from Oct. 5 to Oct. 9, 1953. The Sixth Argentine Congress of Thoracic Surgery and the Second Latin American Congress of Thoracic Surgery will hold their meetings at the same time and will contribute to the program at the combined Section meetings.

The Second Latin American and
Sixth Argentine Congress
Surgery were org
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REVISTA

DEL

CAPITULO ARGENTINO

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COLEGIO INTERNACIONAL
DE CIRUJANOS

COLLEGE INTERNATIONAL DE CHIRURGIENS

Tomo I Octubre a Diciembre 1952 N 4
CASEROS 2153 T. E. 27 - 6162 BUENOS AIRES
Registro de la Propiedad Intelectual. Nº 392.446

Facsimile of cover of official organ of the Argentine Section, International College of Surgeons.

auspices of the Faculty of Medical Sciences of Buenos Aires and the Brazilian Section of the International College of Surgeons. Dr. José Maria Pelliza, President, and Dr. Raul E. Gomez Garcia, Secretary General, of the Argentine Society of Thoracic Surgery add their official invitation, as members of the organizing committee, to that of the Argentine Section.

The Congresses are being held in Curitiba as a part of the Centennial celebration of the State of Parana.

At the combined meetings, Dr. Max Thorek will speak on the subject "Death During Anesthesia." Dr. Jorge A. Taiana, President of the Argentine Section, will discuss "Thoracotomy: Indications and Contraindication," and Dr. Francisco Augusto Pinto, of Brazil, will discuss "Surgery of the Biliary Ducts."

The Congresses of Thoracic Surgery will present special papers on thoracotomy, surgical treatment of tuberculosis of the lungs, management of the cardiovascular malformations of childhood, thoracic physiology, bronchoesophagology and anesthesiology. Other papers of general interest will be presented by speakers from all Brazilian Regional Divisions and from all North and South American Sections of the International College of Surgeons.

Argentine-Brazilian Fellowships Awarded

Prof. Dr. Jorge A. Taiana, President, and Prof. Dr. Abel N. Canonico, Secretary, announce that the Argentine Section has awarded fellowships to several of its members. The fellowships are a continuation of the program of cooperation and exchange between the Argentine and Brazilian Sections.

Internal Fellowships for two months duration and with a stipend of 1,000 pesos monthly including room and board were granted to Drs. Hector Bensimon, Alfredo Ramon Gene, Cesar Augusto de la Vega, Carlos O. Silva Iribarren and Carlos Alberto Arean.

Drs. Bindo Guida Filho, Josedyl Camargo and Antonio Ruy Chaves were awarded External Fellowships for one month with an option of two months with a stipend of 2,000 pesos monthly, including room and board.

The Brazilian Section presented External Fellowships for one month with an option of two months with a stipend of 2,000 cruzeiros, including room and board, to successful candidates Dr. José Casal, Dr. Nicholas N. Perruelo and Osvaldo Angel Franzoni.

Austrian Section

Early in the month of June 1953 the Austrian Section of the International College of Surgeons held a highly successful and stimulating Congress in the universally beloved city of Vienna, which many eminent surgeons of the United States Section, as well as surgeons from many other nations, were privileged to attend and in which many of them were *active participants.*

Prof. Dr. Schönbauer, President of the Austrian Section, and Prof. Dr. Hans Finsterer, President of the International College of Surgeons, were the first to address the Congress. They were followed by Herr Maisel, Federal Minister for Social Administration; Herr Jonas, Mayor of Vienna, and Prof. Chiari, Dean of the Medical Faculty of the University of Vienna. All commented with admiration on the growth of significance of the Austrian Section, first organized after World War II by the tireless efforts of Prof. Dr. Felix Mandl, with Prof. Dr. Finsterer as its first President. On behalf of the guest nations represented, Prof. A. Lezius of Germany, Dr. Brailsford of England and Dr. Max Thorek of Chicago, U. S. A., took the floor to express congratulations and deep appreciation of the fine contributions of the Austrian Section. The opening session closed with an address of thanks by Prof. Dr. Felix Mandl to all who contributed to the Congress or participated therein.

The scientific program included many intensely interesting presentations. Prof. Finsterer, whose fame as a master and originator of surgical technic is worldwide, spoke on permanent results obtainable by plastic operations on the intestines. A method and apparatus that permit the objective visualization of biliary passages during an operation was described by Prof. Baccaglini of Verona. The method was developed by Mallat-Guy (Lyon) and Mirizzi (Argentina). Prof. Mandl, imaginative and creative as always, described a method of his own devising for preoperative roentgen visualization of the biliary passages by injection of a contrast fluid through the skin and the liver. This facilitates differentiation of the pathologic changes associated with carcinoma, cholelithiasis and tissue damage. Prof. Schönbauer presented a preliminary report on diseases of the gallbladder, the object of *his investigation being to determine* whether conservative therapy or surgical intervention is best adapted to the treatment of such conditions.

Among the outstanding guest contributions were those of Dr. C. P. Bailey of Philadelphia, who has won great distinction as a cardiac surgeon; Dr. A. N. Gorelik, F.I.C.S., of New York, who described a procedure in which he sutures the pericardium to the heart in order to provide a better blood supply to the cardi-

Brazilian Section

The Brazilian Section of the International College of Surgeons celebrated its fourth anniversary on May 30 of this year, in the ancient and beautiful city of São Paulo. Surgeons and their families from various sections of Brazil, as well as from many adjoining nations, were present in large numbers. This was due no less to the fact that the College has long been acquainted with the graciousness and charm of Brazil than to the universal desire to express to the Brazilian Section their admiration and appreciation of its truly magnificent achievements in the short span of four years. Membership in the Section shows rapid and continuous growth, thanks to the dedicated efforts of its officers and members, and the energy and effectiveness of its activities are, to say the least, impressive. The College has no more devoted Section, and none to which it points with greater pride.

The morning hours from 8 o'clock until noon were devoted to the election of officers, held at the Secretariat. Details of the election are presented on Page 29.

At 1 p.m., prior to the ceremonial portion of the meeting, a Brotherhood Dinner

At the solemn opening of the Brazilian Section of the International College of Surgeons are Dr. Emmanuel Marquez Porto, President of the Regional Division of Rio de Janeiro, Dr. Menotti Del Picchia, representing the Rector of the University of São Paulo; Patron Dr. José Avelino Chaves, President of the Brazilian Section; Dr. Waldyr da Silva Prado, Secretary of the Section representing the Quartel General of the Fourth Air Zone, Parque Aeronautics, São Paulo; Dr. Mario Ramos de Oliveira, representing the Medical and Surgical Society of São Paulo; Prof. Lucas Machado, Member of the Board of Trustees of Belo Horizonte; Prof. Carlos Gama, Vice-President of the International College of Surgeons, and Dr. Pedro Cerqueira, Member of the Board of Trustees of Ribeirão Preto.

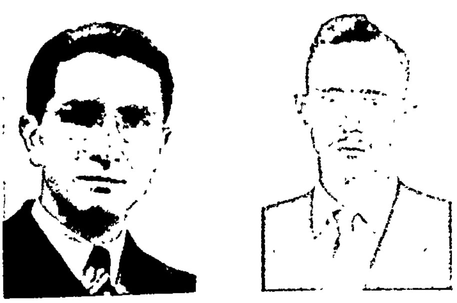
Interested attendants at the meeting commemorating the Fourth Anniversary of the founding of the Brazilian Section of the International College of Surgeons.

Members of the Board of Trustees of the Brazilian Section at the reunion dinner in *São Paulo:* Dr Emanuel Marques Porto, Prof. Dr. Carlos Gama, Dr. José Avelino Chaves, Prof. Lucas Monteiro Machado, Dr. José Maria Cabello Campos, Dr. Oscar Cintra Gordinho, Prof. Ro [illegible] De Freitas, Dr. Antonio Candido Vicente De Azevedo, and Dr. Pedro Cerqu

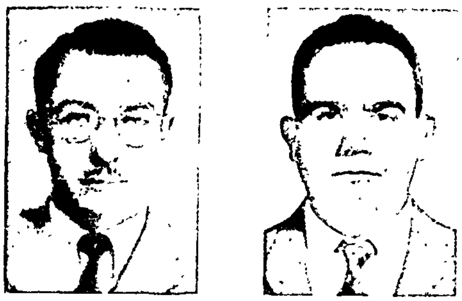
Dr. Emanuel Marques Porto, Member of the Board of Trustees of the International College of Surgeons and President of the Regional Division of Rio de Janeiro, salutes guests at the reception at the home of Dr. and Madame Cintra Gordinho.

bers from seven regions: Belo Horizonte, Rio de Janeiro, Ribeirao Preto, Alta Araraquarense, Santos, Central Brazil and São Paulo. The newly inducted members were then awarded their diplomas, with a few words of salutation from Dr. Waldyr da Silva Prado in the name of the Brazilian Section. The Section's patron, Dr. Menotti Del Picchia, presented an appropriate and memorable address, and the solemnities were concluded formally with the Recessional Hymn.

After these ceremonies Dr. Oscar Cintra Gordinho, newly elected President of the Section, with Madame Gordinho, held a reception for all the Directors, all members of the Board of Trustees, all new members of regional groups and the civil



Prof. Dr. Francisco Elias Godoy Moreira, Vice-President, and Dr. Aloysio Geraldo Ferreira De Camargo, Secretary.



Dr. Paulo Braga De Magalhaes, Assistant Secretary, and Dr. Fausto Seabra, Treasurer.

and military dignitaries in attendance at the solemn session just completed. The reception, a most charming occasion, will long be remembered by the guests.

The officers elected at the morning session of the meeting are as follows:

Directorate of the Brazilian Section of the International College of Surgeons

President	Dr. Oscar Cintra Gordinho
President-Elect	Dr. Eurico Branco Ribeiro
Vice-President	Prof. Dr. Francisco Elias Godoy Moreira
Secretary	Dr. Aloysio Geraldo Ferreira de Camargo
Assistant Secretary	Dr. Paulo Braga de Magalhães
Treasurer	Dr. Fausto Seabra
Assistant Treasurer	Dr. Adalberto Leite Ferraz

Regional Directorates

Salvador

President	Dr. Eduardo Cerqueira
Vice-President	Dr. Milton Luz
Secretary-Treasurer	Dr. Jesuino Netto
Electoral Delegate	Dr. Manoel Pereira

Belo Horizonte

President	Dr. José Octaviano Neves
Vice-President	Dr. Edmundo Pinto
Secretary-Treasurer	Dr. Bayard Gontijo
Electoral Delegate	Prof. Dr. Herminio Ferreira Pinto

Rio de Janeiro

President	Dr. Bernardo Moreira Garcez
Vice-President	Dr. Geraldo Barrozo
Secretary-Treasurer	Dr. Francisco Augusto Pinto

Electoral Delegates

Dr. João Oscar Espindola
Dr. Godofredo da Costa Freitas
Dr. Marcos Merhy
Dr. Geraldo Cabral

Ribeirão Preto

President	Dr. Arnaldo Bacellar
Vice-President	Dr. Georgides Goncalves
Secretary-Treasurer	Dr. Fabio Santos Musa
Electoral Delegate	Dr. Cezario Lima Horta

Londrina

President	Dr. Emilio Gomes Fialho
Vice-President	Dr. João Dias Ayres
Secretary-Treasurer	Dr. Octavio Genta
Electoral Delegate	Dr. Ricardo E. Skwronck

Central Brazil

President	Dr. Euripedes Garcia
Vice-President	Dr. Victor Mascarenhas
Secretary-Treasurer	Dr. Eduardo Vellozo Vianna
Electoral Delegate	Dr. Alvaro Lopes C

Recife

President	Prof. Dr. Eduardo Wanderley
Vice-President	Dr. João Suassuma
Secretary-Treasurer	Dr. Cezar Montezuma
Electoral Delegate	Dr. Jorge Glasner

Santos

President	Dr. Aloysio Ribeiro Mendonca
Vice-President	Dr. Jorge Michalany
Secretary-Treasurer	Dr. Jayme Melchert de Castro
Electoral Delegate	Dr. Arthur Domingues Pinto

Campinas

President	Dr. Gabriel Oliveira da Silva Porto
Vice-President	Dr. Armando Rocha Brito
Secretary-Treasurer	Dr. Paulo Mangabeira Albernaz
Electoral Delegate	Dr. Manoel Alexandre Marcondes Filho

Curitiba

President	Dr. João Vieira de Alencar
Vice-President	Dr. Eduardo Virmond de Lima
Secretary-Treasurer	Dr. Oswaldo Fario da Costa

Alta Araquarense

President	Dr. Oscar Barros Serra Dória
Vice-President	Dr. Wenceslau Botelho
Secretary-Treasurer	Dr. Radovir dos Santos
Electoral Delegate	Dr. Ernani Pires Domingues

Juiz de Fora

President	Dr. José Dirceu de Andrade
Vice-President	Dr. Carlos de Castro Teixeira
Secretary-Treasurer	Dr. Geraldo Magela de Abreu Guedes

Fortaleza

President	Dr. Luiz Gonazaga da Silveira
Vice-President	Dr. José Gomes da Frota
Secretary-Theasurer	Dr. José Galba de Araujo
Electoral Delegate	Dr. Newton Gonçalves

Porto Alegre

President	Prof. Dr. Cesar Avila
Vice-President	Dr. Tauphick Saadi
Secretary-Treasurer	Dr. Léo Mabilde
Electoral Delegate	Prof. Dr. J. C. Milano

Vitoria

President	Dr. Affonso Bianco
Vice-President	Dr. Carlos Pandolfo Teixeira
Secretary-Treasurer	Dr. Paulo Diniz de Oliveira Santos

Niteroi

President	Dr. Mario Duarte Monteiro
Vice-President	Dr. Humberto Milton Dantas
Secretary-Treasurer	Dr. Giuseppe Mauro
Electoral Delegate	Dr. Humberto M. Dantas

Petropolis	
President	Dr. Nelson Sá Earp
Vice-President	Dr. Sydnei Luiz Azevedo
Secretary-Treasurer	Dr. Acacio Souza Branco
Maceió	
Regent	Dr. Ib Gato Marinho Falcão
Manáus	
Regent	Dr. Romualdo Seixas
Bauru	
Regent	Dr. Arnaldo Prado Curvello

The election was held by secret ballot. The names of those elected will be submitted to the International Board of Trustees for approval. The new officers will formally assume their duties on Oct. 9, 1953, at the time of the Second Congress of the Brazilian Section and the First Pan-American Congress of the International College of Surgeons, to be held in Curitiba, State of Parana. The term of office is two years.

The twenty-one active regional divisions of the Brazilian Section are alone a striking testimony to its rapid growth. On this and on all other achievements, past, present and to come, the Brazilian Section merits and receives the sincere and hearty congratulations of the College.

Colombian Section

Members of the Colombian section of the International College of Surgeons who attended a banquet
Bogotá. Standing, left to right, are Drs. Alberto Delgadillo Vargas, Alfonso Pabón Pabón, I
Rojas Turringo, Carlos Gómez Barragan, Antonio Ordoñez Plaja, José Miguel H
jarano Laverde, Alfonso Bonilla Naar, Enrique Darnalt Restrepo, Alfredo Pinto
Rodriguez y Jorge Castro Duque. Seated, left to right, are Drs. Cesar
Pedro Eliseo Cruz, Marco T. Aguilera C

Monthly meetings are now being held by the Colombian section. The first was in June and dealt with "Postoperative Complications of Cholecystectomy."

According to Dr. Antonio Ordonez Plaja, Secretary, "The meeting was a complete success and all the members of the Columbian Section attended, including some members living outside of Bogotá who welcomed the opportunity to join us for such an occasion. We anticipate much progress for our Section."

NINTH INTERNATIONAL CONGRESS, 1954

Under the Sponsorship of the Brazilian Government

Notice to All Members of the International College of Surgeons:

The House of Delegates on May 9, 1952, in Madrid, Spain, decided that the City of São Paulo would be the meeting place of the next International Congress, approving the suggestion of His Excellency the Governor of the State, Prof. Dr. Lucas Nogueira Garcez. Brazilian members of the Board of Trustees were appointed to the Commission organizing the Congress, under the direction of Prof. Dr. Carlos Gama, Vice-President of the International Congress and Secretary General for South America.

The Ninth International Congress will be held from April 26 to May 2, 1954. The official topics are (1) experience with socialized medicine in different countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the Fourth Centennial of the city of São Paulo, it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commenorative activities of São Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure that the program shall be absolutely functional, all who are interested are requested to write to the address below.

—Prof. Dr. Carlos Gama, Secretariat, Praca Ramos de Azevedo, 7°
Andar, Sala 710, São Paulo, Brazil.

Organizing Commission

Carlos Gama
José Avelino Chaves
Oscar Cintra Gordinho
Eurico Branco Ribeiro
Rodolpho de Freitas
A. C. Vincente Azevedo

Emanuel Marques Porto
Lucas M. Machado
José Médicis
Fernando Luz Filho
Benjamin Rocha Sales
Elpidio V. Cannabrava

Pedro Falcão
Membros Brasieiros
do "Board of Trustees"
J. M. Cabello Campos
Tesoureiro do
Capitulo Brasileiro

Dutch and French Sections

An impressive ceremony marked the opening of the recent joint meeting of the French and Dutch Sections of the International College of Surgeons on April 8, 9 and 10 of this year. The meeting was held in the Royal Tropical Institute of Amsterdam and was attended by many surgeons and their families, not only from France and the Netherlands but from the Italian, British and United States Sections as well.

Dr. George Chapchal, President of the Dutch Section, welcomed the members and guests in a warmly cordial address. Several other dignitaries followed him as speakers: M. Hummel, Consul General of France; Prof. Polonovski, President of the French-Netherlands Society; Dr. Bloch, delegate from the United States; Dr. Brailsford, delegate from Great Britain, and Prof. Dr. Boerema, official representative of the University of Amsterdam. All spoke with enthusiasm of the progress made by the French and Dutch Sections since their organization. Prof. Dr. Raymond Darget, President of the French Section of the College, concluded the session with a brilliant address.

The surgeons and their families were then shown about the Royal Tropical In-

**Speakers at opening and closing sessions of the Amsterdam Congress of the Dutch
tions of the *International College of Surgeons. 1, Prof. Chapchal, President of t*
tion; 2, Prof. Polonovski, President of the France-Netherlands Association;
States; 4, Dr. Brailsford of Birmingham, England; 5, Prof. I. Boerema
Velter, DuVirgny and Glazenburg; 7, Prof.**

Banquet speakers at the Amsterdam Congress of the French and Dutch Sections of the International College of Surgeons. *1*, Prof. Herman Renier Bax of Arnheim; *2*, Dr. Marc Iselin of Paris; *3*, Prof. von Breemer, Director; *4*, Prof. Raymond Darget of Paris.

stitute, one of the most interesting features of that interesting city, Amsterdam. Surgical scientific meetings were held after luncheon, and in the evening a series of excellent surgical films was displayed.

The sessions on April 9 began at 8 a.m., with an opportunity to observe the Amsterdam surgeons at work in their respective hospitals. The attendance was too large to permit accommodation of all the surgeons in Amsterdam; some of them, therefore, were taken to Utrecht by bus. There they were invited to observe operative procedures at the Surgical Hospital of the University of Utrecht. Prof. Dr. Nuboer, Director of the Hospital, received them most graciously and left nothing undone to make their visit both pleasant and profitable.

The afternoon session was filled with satisfying scientific discussions, with another surgical film exhibit scheduled for the evening. A film of particular interest was shown by Prof. Dr. Max Lange, delegate from Germany.

On the morning of April 10, operative demonstrations were held in Amsterdam, Hilvers and Utrecht. In the afternoon, valuable presentations in the fields of Ophthalmology and orthopedics were presented. Short business meetings were held by the officers of the French Section and by the official delegates from other nations, while the guests not so occupied were entertained by a special program of Indonesian music.

The final meeting began at 6:15 p.m. with a short address by Dr. Chapchal. Dr. Darget, as President of the French Section, then announced special honors awarded by the French Government to two distinguished members of the Netherlands Section: Dr. van Capellen, Honarary Fellow of the International College of Surgeons, who received the decoration of an "Officier de la Santé Publique," and Dr. Chapchal, who was made an "Officier de l'Academie." Dr. Chapchal expressed sincere appreciation of both decorations, and heartily thanked all the members who had contributed to the great success of the meeting.

A closing reception and banquet provided a fitting climax to the three days of study and companionship. Memorable addresses were given by Dr. Chapchal, Dr. Brailsford, Dr. Bloch, Prof. Dr. Lange, and Dr. van Capellen, as well as by Dr. Henricius J. M. Weve, of the University of Utrecht; Dr. Gregoire, representative *from Belgium*; Dr. *van Bremen of Amsterdam*; Prof. Dr. Jean Creyssel of France; Dr. Jacobus Glazenburg, of the Netherlands, and Dr. Marc Iselin of Paris. Other guests of honor were Dr. Frederick van Gulik, Secretary and Treasurer of the Dutch Section, and Profs. Drs. Marcel Thalheimer, Edmond Velter and A. P. Lachapéle, prominent French Fellows of the International College of Surgeons.

Dr. Darget closed the banquet by proposing a toast, which, needless to say, was responded to with enthusiasm. So much understanding and good fellowship abounded that the convivialities were continued into the early hours of the morning.

LA PRESSE MEDICALE

La Grand Journal Français de Chirurgie et de Medicine parait chaque semaine, et donne toutes les informations scientifiques et professionelles

ABONNEMENT

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LA PRESSE MEDICALE, *Masson et Cie, éditeurs*

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Italian Section

The highly successful 1953 Annual Congress of the Italian Section of the International College of Surgeons was held in Rome on June 11, 12 and 13. The immense attendance, made up of surgeons and their wives from many nations, including the United States, gave evidence of the high standing and the progress of the Italian Section of the College.

The Executive Organizing Committee responsible for the Congress was made up of eminent surgeons of the Italian Section: Prof. R. Bastianelli, F.I.C.S. (Hon.), Honorary President; Prof. R. Paolucci di V., F.I.C.S. (Hon.), President; Profs. G. Ceccarelli, F.I.C.S., of Padua, and Prof. A. M. Dogliotti, F.I.C.S., of Turin, Vice-Presidents; Prof. G. Bendandi, F.I.C.S., Secretary; Drs. A. Parentela and G. Ricci, Vice-Sergeants, and Dr. C. Dinia, Treasurer. Except for Profs. Ceccarelli and Dogliotti, all are resident in Rome.

The Scientific Committee consisted of thirty-one members, all surgeons of high standing, and the excellence of the scientific program indicates their competence in judging the contributions available.

Inauguration of the Congress took place in the Campidoglio in Rome, by permission of the mayor of Rome. The scientific sessions were held at the Policlinico Umberto I. Prof. A. Segni, Minister of Public Education, welcomed participants and guests in the name of the Italian Government.

Greetings were also extended by the Mayor, in the name of the city of Rome; by Prof. Ceccarelli, President of the Italian Section; by Dr. Arnold S. Jackson of Madison, Wisconsin, speaking for the foreign delegates, and by Dr. Max Thorek,

The Campidoglio in Rome, where the Inauguration of the Congress of the Italian Section of the International College of Surgeons took place.

Portion of assemblage at the opening session of the Fourth Congress of the Italian Section of the International College of Surgeons.

Founder and Permanent Secretary General of the International College of Surgeons. The President of the Executive Committee, Prof. Paolucci di V., formally announced the opening of the Congress.

A program rich in scientific value and effectiveness, up-to-the-minute in content and admirably presented, followed the inauguration ceremonies and filled the three days with enthusiasm and stimulation. Among participating surgeons from nations other than Italy were Dr. G. Wolfsohn, F.I.C.S., President of the Israel Section of the International College; Dr. J. F. Brailsford, F.I.C.S., of Birmingham, England; Dr. P. Clarkson, F.I.C.S., of London; Prof. R. Darget, F.I.C.S., of Paris; Dr. E. Thiermann, F.I.C.S., of Erlangen, Germany; Dr. Eurico Branco Ribeiro, F.I.C.S., of São Paulo, Brazil, and Dr. C. Reimers, F.I.C.S., of Wupperthal, Germany. Participants from the United States were Dr. V. Mazzola, F.A.C.S., F.I.C.S., of Brooklyn; Dr. C. Bornemeier, F.A.C.S., F.I.C.S., of Chicago; Dr. A. J. Lesser, F.I.C.S., of Los Angeles; Dr. H. Sered, F.I.C.S., Dr. F. H. Falls, F.A.C.S., and Dr. B. P. Zummo, F.A.C.S., all of Chicago; Dr. A. N. Gorelik, F.I.C.S., of New York; Dr. F. Pearl, F.A.C.S., F.I.C.S., of San Francisco; Dr. C. P. Bailey, F.A.C.S., F.I.C.S., of Philadelphia; Dr R. W. McNealy, F.A.C.S., F.I.C.S., of Chicago; Dr. Arnold S. Jackson, F.A.C.S., F.I.C.S., of Madison, Wisconsin; Dr. Henry H. Kessler, F.A.C.S., F.I.C.S., head of the Kessler Institute for Rehabilitation in New Jersey; Dr. Katherine Stevenson, F.A.C.S., F.I.C.S., of Santa Barbara, California; Dr. H. E. Turner, F.A.C.S., F.I.C.S., of Chicago; Dr. E. J. Halligan, F.A.C.S., F.I.C.S., of Jersey City; Dr. Clement L. Martin, F.A.C.S., F.I.C.S., of Chicago; Dr. Leonard Averett, F.A.C.S., F.I.C.S., of Beverly Hills, California; Dr. E. F. Berman, F.A.C.S., F.I.C.S., of Baltimore; Dr. Max Thorek, F.B.C.S., F.I.C

F.P.C.S. (Hon.), F.R.S.M., of Chicago, Founder and Secretary General of the College; Dr. M. Simon, F.A.C.S., F.I.C.S., of Poughkeepsie, New York, and Dr. G. W. Theobald, of Birmingham, Alabama. Including the contributions of all these program participants from outside Italy, the total number of scientific papers offered at this remarkable Congress was ninety-four.

In addition, symposiums and special sessions were held, including the showing of scientific films and surgical demonstrations at the Polyclinico and various Roman hospitals. All were impressive, well handled and highly rewarding.

On the social side, the Congress was memorable for the international cordiality and good will that were displayed throughout. The most thoughtful preparations had been made to insure that all in attendance should have every facility for comfort, convenience and entertainment. A special Reception Committee for the ladies included Signora Lucille Bastianelli; Signora Elena Marino Zucco; Signora Nicoletta Marcozzi Paolucci (Contessa di Valmaggiore); Signora Amata Canaperia; Signora Ivonne Margottino; Signora Rita Valdoni, and Signorina Sofia Zanchini (Contessa di Castiglioncho). Two charming social events marked the first day of the Congress; a vermouth party given by the President of Ente Provinciale del Turismo at the Casina della Rose, Villa Borghese, and cocktails at the Grand Hotel in honor of the foreign delegates, on which occasion the General Director of Cultural Relations of the Italian Foreign Office was host to the assembly. On Friday, the second day, a banquet was given at the Belvedere della Rose, with four

Opening session at the Fourth Congress of the Italian Section of the International College of Surgeons in Rome. Left to right, Dr. Max Thorek; Prof. Ceccarelli; the Minister of Education; the Mayor of the City of Rome; Prof. Paolucci; Prof. Bastianelli, and Dr. Arnold S. Jackson (speaker)

Special audience with Pope Pius XII, arranged for surgeons and their wives attending the Fourth Congress of the Italian Section of the International College.

orchestras, an excellent floor show, and dancing. Sightseeing tours had also been arranged and were greatly enjoyed. It is safe to say that no guest of the Congress in Rome left the Eternal City without a wealth of delightful memories.

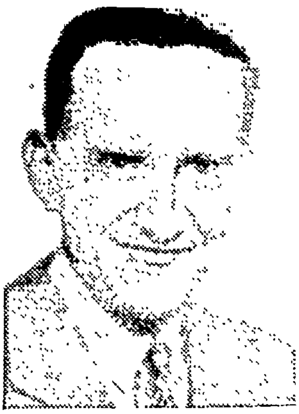
Roman Surgical Journal Honors Congress

The editors and publisher of *Gazetta Internazionale di Medicine e Chirurgia* (International Gazette of Medicine and Surgery), published in Rome, devoted one entire issue to a thoroughgoing and excellent coverage of the Congress, with summaries of the presentations in both Italian and English. This is a gracious gesture much appreciated not only by the Italian Section but by the International College of Surgeons as a whole.

Prof. Dogliotti Reports to Surgical Society

Prof. A. Mario Dogliotti, F.A.C.S. (Hon.), F.I.C.S. (Hon.), President of the Piedmontese Surgical Society, recently delivered to that organization the customary annual presidential report of progress for the year just past. This Society cooperates closely with the Italian Section of the International College of Surgeons, of which Prof. Dogliotti is so distinguished an exponent, and good tidings of the Society are always warmly received by the collaborating Section.

Good tidings formed the major portion of the 1952 report. Prof. Dogliotti a
nounced that all expenses for the year,
cluding the total cost of pu
issues of the Society's b
duly met, the budget clo
surplus. He expressed



Dr. A. Mario Dogliotti, F.A.C.S. (Hon.), F.I.C.S.

Society's thanks to Dr. Luigi Solerio, Treasurer, for the financial report, and to Prof. Biancalana, former President, and the Pharmacological Society for their valued assistance. He then announced the appointment of Prof. L. de Bernardi and Prof. P. C. Borsotti as Auditors, and sent greetings to the new Directors at Turin, Profs. Borsotti, Giordanago, Ferrero and Negro:

"Our total membership," said Prof. Dogliotti, "is 287, including 2 honorary members and 4 foreign members. Two of these, Prof. Luisada and Prof. H. Resano, were nominated last year. The charter membership was reduced to 13 by the death of Prof. A. Jachia. There are 214 in active membership, including 13 who joined the group in 1952."

The year's activities, said Prof. Dogliotti, were both numerous and memorable. "We had 11 public meetings in 1952 . . . Among the distinguished speakers were Prof. G. Forni, Prof. G. Ceccarelli, Prof. G. Sanvenero-Roselli, Prof. V. Pettinari, Prof. L. J. Hansen of Copenhagen, Prof. A. Luisada, and Prof. R. De Vernejoul of Marseilles. Topics chosen for discussion included cerebrovascular surgery, scar stenosis of the biliary passages and mitral stenosis. We exhibited many scientific motion pictures, showing the cardiac surgical technic of Paolucci, Valdoni and Dogliotti; the artificial heart-lung of Constantini; the thoracoplastic technic of Jens Hansen; the cross-circulation procedure of Ruffo and Lange; Malan's venous graft for venous obliteration; Ceccarelli's therapeutic pericarditis, and a film entitled 'The A-Bomb and the Physicians of Sanvenero.'

Prof. Dogliotti then spoke enthusiastically of the Society's library, which, he said, is rich in books and periodicals received as gifts or in exchange for the organization's bulletin. It has been reorganized, and its full privileges are available to all members. A complete list of the periodicals obtainable at the library will be published in the near future.

The incalculable value of a good professional library to the scientific scholar and practitioner is well appreciated by the members of the Society and of the Italian Section of the College.

In the course of his address, Prof. Dogliotti paid moving and eloquent tribute to members and colleagues deceased in 1952, recalling some outstanding excellence of each. Of Prof. Aldo Constantini, his own

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Seduta del 28 marzo 1953
Seduta del 29 marzo 1953

Bollettino e Memorie
della
SOCIETÀ PIEMONTESE
DI
CHIRURGIA

Organo Ufficiale della Sezione Italiana
dell'• International College of Surgeons •

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pupil and collaborator for many years, Prof. Dogliotti said:

"From the beginning of our acquaintance Prof. Constantini showed himself willing to make every sacrifice required of a man who chooses a scientific career. He was tirelessly persevering. His methodical habits of work and his brilliant mind gave early promise of a successful career . . . Few men have spent so much time with a patient both before and after an operation, and few have so mastered surgical technic in all its intricacies, as did Aldo Constantini . . . His contributions to the pathology of the bowel and peritoneum, his strikingly original innovations in surgical technic, some of which I have proposed should bear his name, and his work on extracorporeal circulation are especially important. His was the rigorous objectivity that marks the true scientist."

Of Prof. Giulio Segre, who died last December, Prof. Dogliotti observed, "He was a man beloved by all who knew him. He was always disposed to help anyone . . . he was particularly sympathetic to the problems of youth."

Further breaks in the ranks, said Prof. Dogliotti, were occasioned by the passing of Prof. Jachia, a former Councillor of the Society, and Prof. Virando. Of its honorary members, the Society mourned the passing of Theodore Hryntschak, Professor of Surgery at the University of Vienna, and Henry Constantini, Professor of Surgery at the University of Algiers. Among correspondent national members, death removed Prof. G. Pieri and Prof. C. Camberini. Prof. Dogliotti, in behalf of the Society, expressed the highest admiration and appreciation of these men and the profoundest condolence to the bereaved.

Concluding his report, Prof. Dogliotti congratulated the Society on its outstanding work in 1952 and pledged himself to do his utmost, with the able assistance of Dr. Psacharopulo, General Secretary, to assure even greater progress in 1953.

Peruvian Section

A large group of members of the Peruvian Section of the International College of Surgeons were honored by being elected as officers of the Peruvian Academy of Surgeons for this year. The officers chosen are as follows:

President	Dr. Gerardo Lozada, F.I.C.S.
Vice-President	Dr. Aurelio Díaz Ufano, F.I.C.S.
Secretary General	Dr. Esteban D. Rocca, F.I.C.S.
Recording Secretary	Dr. Francisco Sánchez Moreno
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Treasurer	Dr. Alfredo D. Curotto, F.I.C.S.
Librarian	Dr. Victor M. Bazul, F.I.C.S.
Director of Publications	Dr. Alejandro Higginson, F.I.C.S.

Spanish Section

A meeting of the Spanish Section of the International College of Surgeons was held in Madrid on May 19 and 20, 1953.

An initial ceremony opened the meeting in the Great Hall of the National Institute of Medicine. All of the Spanish surgeons were present who participated in the magnificent Madrid Congress of the International College of Surgeons in 1952. They recalled the memorable experiences and international comradeship found in last year's Congress and enthusiastically looked forward to sharing another meeting with their colleagues.

Prof. Dr. Martin Lagos, President of the Section, opened the meeting with a brief address of warm welcome to the surgeons. He then analyzed the Constitution and By-Laws of the Spanish Section with their various amendments and presented them to the Assembly for acceptance. The members unanimously adopted them.

The following officers were elected by acclamation:

President:
  Prof. F. Martin Lagos
1st Vice-President:
  Prof. J. Garcia Orcoyen
2nd Vice-President:
  Dr. J. Soler-Roig
Secretary General:
  Prof. A. de la Fuente Chaos
Vice-Secretary:
  Dr. M. Merchan Gonzales
Treasurer:
  Prof. A. de la Pena Pineda

Prof. F. Martin Lagos (right), President of the Spanish Section, exchanges a word with Prof. A. de la Fuente Chaos, Secretary General of the Section. To the left of Prof. Dr. Lagos, Mrs. Morris Fishbein of Chicago.

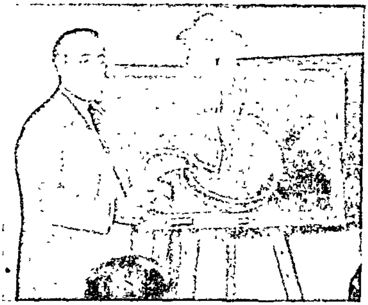
Executive Council:

Dr. T. Rodriguez de Mata
Dr. V. M. Nogeuras
Dr. L. Garcia Tornel
Dr. A. Garcia Baron
Dr. C. Pera
Dr. J. Garcia Moran
Dr. R. Sanchez Parra

The presentation of diplomas followed in a ceremony of great dignity and beauty. Honorary Fellowships, approved by the International Board of Trustees and transmitted through the officers of the Spanish Section, were conferred upon Profs. M. Varela Radio, Buenaventura Carreras, Leon Cardenal, Leonardo de la Pena.

The afternoon was filled with stimulating scientific papers on the theme "Problems in the Surgical Treatment of Cancer of the Stomach." Dr. Martin Lagos opened the discussion and it was carried on by Drs. Garcia Baron, Salamanca, Delgado, and Prof. de la Fuente. The primary conclusion of the session was that the most important thing in treating cancer of the stomach was early diagnosis and prompt surgical intervention with total gastrectomy. The members decided to make a study of totally gastrectomized patients to see what results had been obtained after a certain period had elapsed. This study, with statistics, will be presented at a later meeting.

On the morning of May 20 the surgeons took advantage of the opportunity to visit the various hospitals of Madrid. In the afternoon another scientific session was held at the Faculty of Medicine. The subject studied was "Surgery of Hydatid Cysts of the Lung." The opening theme was presented by Prof. de la Fuente and was discussed by Prof. Martin Lagos and Drs. Moral, Gil Turner and Merchan. The conclusion reached was that extirpation of the cyst is the procedure of choice, other procedures being reserved for special cases.



Prof. de la Fuente discussing cancer of the stomach at the Madrid Meeting of the Spanish Section of the International College of Surgeons.

The two-day meeting closed with a banquet at the Hotel Palace, serving as a brilliant and satisfying finale to the scientific sessions. The surgeons left the Madrid meeting with a sense of having attended successful and satisfying scientific meetings and of having shared warm fellowship with their colleagues.

Dr. Berman is Speaker

Dr. Edgar F. Berman, F.A.C.S., F.I.C.S., of Baltimore, Maryland, addressed the Fellows of the Spanish Section of the International College of Surgeons on the subject "The Plastic Esophagus."

Venezuelan Section

The Venezuelan Section met recently to reactivate their organization and are looking forward enthusiastically to meeting again in many activities of the year.

New officers were elected at the meeting. Prof. Dr. Alfredo Borjas, F.A.C.S., F.I.C.S., Professor of Urology at the University of Caracas, was elected President; Prof. Dr. José Manuel Espino, F.A.C.S., F.I.C.S., Honorary Professor of Clinical Ophthalmology at the University of Caracas, was elected Vice-President; Prof. Dr. Leopoldo E. López, F.A.C.S., F.I.C.S., Associate Professor of Gynecology at the University of Caracas, Diplomate of the American Board of Urology and Secretary of the Venezuelan Surgical Society, was elected Secretary; Prof. Dr. Luis Rodriguez Santana, F.I.C.S., Chief of the Urologic Clinic at the Hospital Vargas in Caracas, was elected Treasurer.

The Fellows of the reactivated Section are as follows: Prof. Drs. Leopoldo Aguerrevere, R. Baquero Gonzáles, Franz Conde Jahn, Salvador Córdoba, Fernando R. Coronil, P. Blanco Gásperi, Jorge Gonzáles Celís, P. A. Gutierrez Alfaro, J .J. Gutierrez Osorio, David Iriarte, Pablo Izaguirre, José Izquierdo, C. Lepage, Domingo Luciani, Francisco Montbrum, Miguel Pérez Carreno, Jesús Rhode, Hermógenes Rivero, J. T. Rojas Contreras, Carlos R. Travieso, M. E. Valdivieso, and Drs. Victor Brito, Angel R. Bustillos, Julio Calcauno, J. Hernández D'Empaire, Félix Lairet, Luis R. Méndez, Carlos Ottolina, Odeardo León Ponte and R. Vetancourt Ravard.

◆

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In Memoriam

JAMES SCOTT CHALMERS

M.D., F.I.C.S.

Dr. James Scott Chalmers, of Sand Springs, Oklahoma, died on March 22, 1953 at the age of 57. Dr. Chalmers, an occupational surgeon, was a member of the staff of St. Johns Hospital in Tulsa, Oklahoma, since 1933, a member of the visiting staff of Hillcrest Hospital in Tulsa, and was chairman of the [illegible] State Society Committee on [illegible] and Traumatic Surgery.

He was born in [illegible] He attended the Morgan [illegible] Academy in Chicago and [illegible] Virginia. He received [illegible] from the University of Vi[illegible] and interned at Su[illegible] in Clintwood, Virginia [illegible] residency at Norton Hos[illegible] Virginia, in 1927 and was [illegible] Sand Springs Home Hospital [illegible] 1933. He was a member [illegible] County Medical Society, the [illegible] Medical Society, the Texas State Medical Society, and the American Medical Association. He was a Fellow of the International College of Surgeons.

LEO CLIFFORD CLOWES

M.D., F.I.C.S.

A surging wave of water from a flash flood swept Dr. Leo C. Clowes, 62, to his death on June 9, 1953, when he was fishing at his summer home near Chicago, Illinois. Dr. Clowes had just recently been accepted as a Fellow of the International College of Surgeons. The degree will be conferred to him posthumously at the Annual Assembly in New York City at the Convocation ceremony.

Dr. Clowes was Attending Surgeon at Hinsdale Hospital in Chicago. He received an A.B. from Illinois College and an M.D. from Rush Medical School in 1923 and interned at Presbyterian Hospital.

He was affiliated with the Gastro-Intestinal Clinic at St. Luke's Hospital, was Assistant in the Department of Surgery at the University of Illinois, was President of Staff of Elmhurst Hospital, and was Associate in the Department of Surgery at Cook County Hospital where he did postgraduate study. He taught at Rush Medical School, at Northwestern University, and at the University of Illinois Medical College.

BRIAN ETHELBERT BARLOW

M.D., A.I.C.S.

Dr. Brian E. Barlow, of Dermott, Arkansas, died May 21, 1953 at the age of 43. He was former Chief of Staff and Secretary of Staff of St. Mary's Hospital of Dermott.

Dr. Barlow received an A.B. from Westminster College in Fulton, Missouri, and an M.D. from the University of Arkansas where he was an assistant in the Department of Pathology. He interned, served his residency, and did postgraduate study at Scott and White Hospital in Temple, Texas. He was a member of the staff at the Tuberculosis Sanatorium of Arkansas.

He was a member of the Chicot County Medical Society, the Southeast Arkansas Medical Society, the Fourth Councilor District Society, the Arkansas Medical Society, the American Medical Association, and the Southern Medical Association and was an Associate of the International College of Surgeons and a Fe[illegible] the A[illegible]can College of Chest

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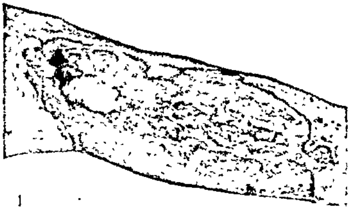

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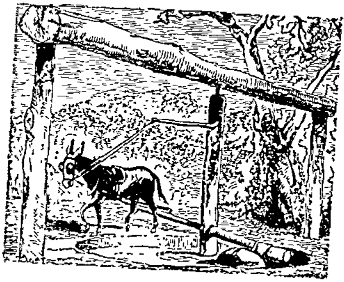

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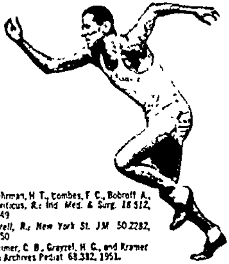

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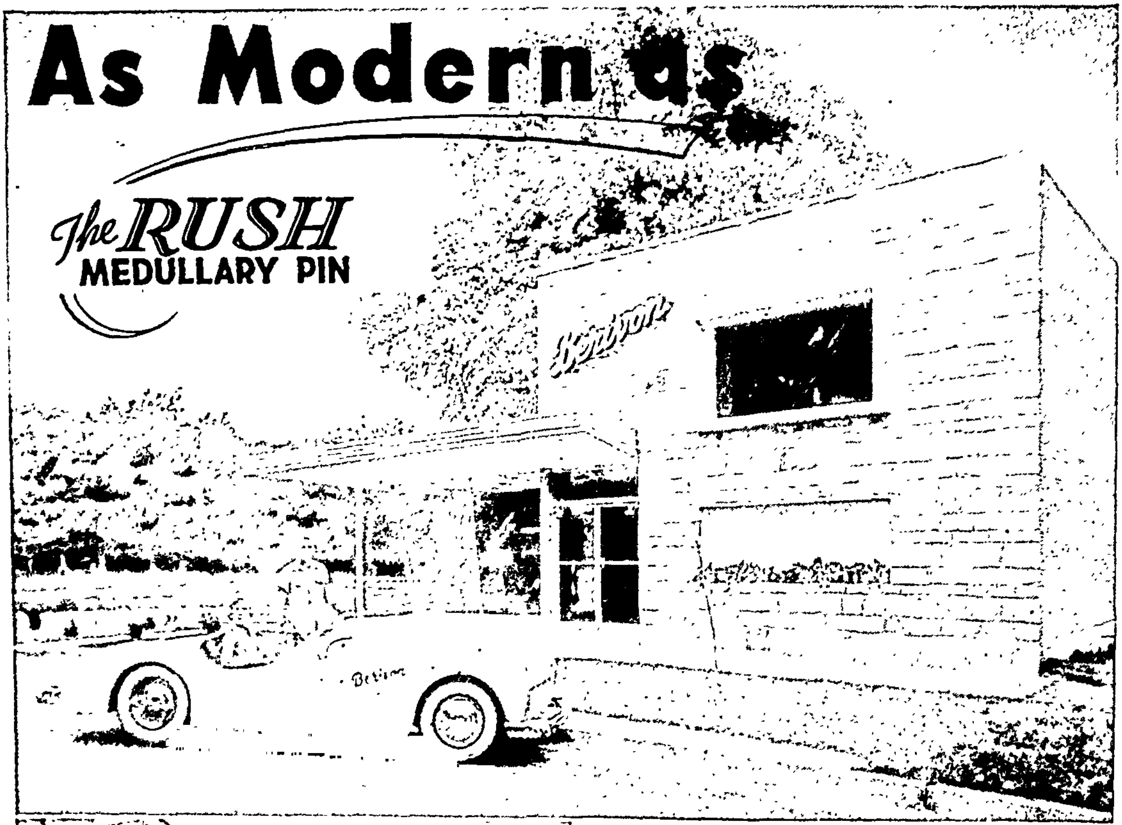

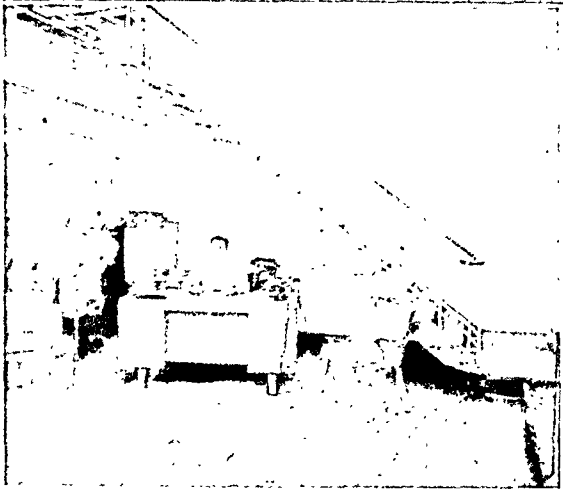

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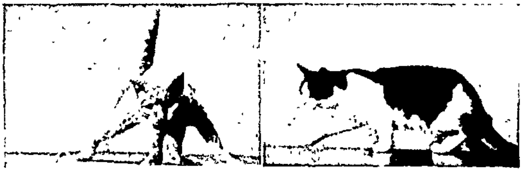

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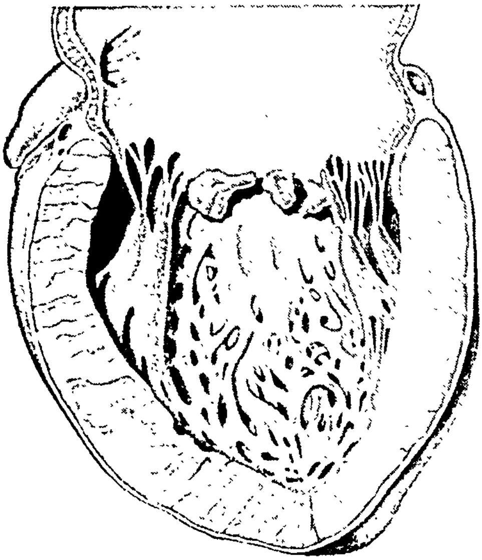

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1. Wellman, W. E.: *Postgrad. Med.* 12: 167, August 1952.

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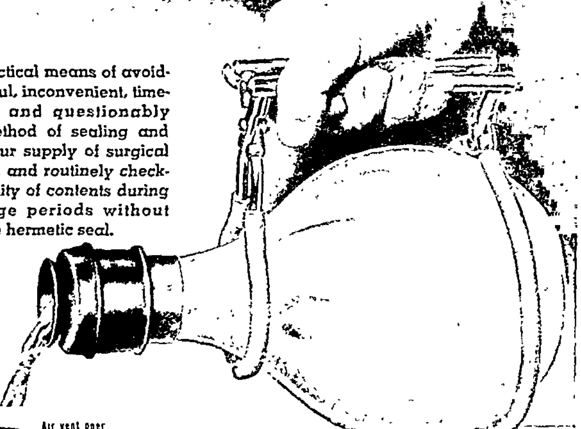

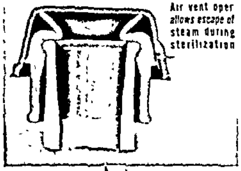

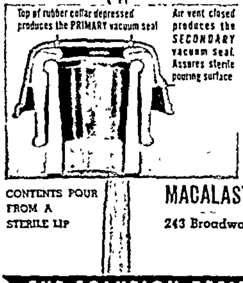
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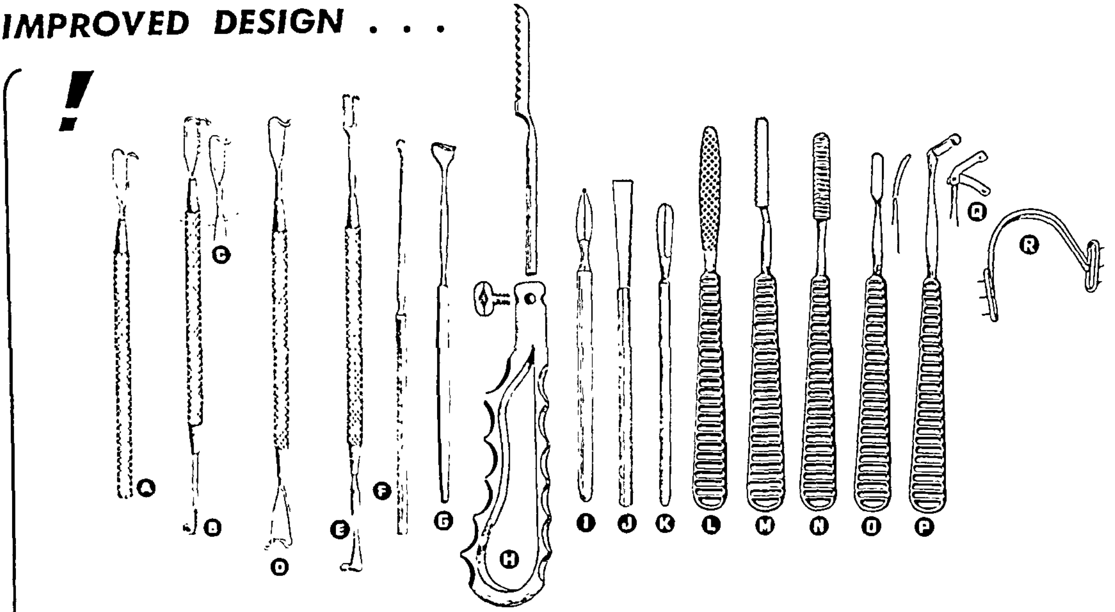

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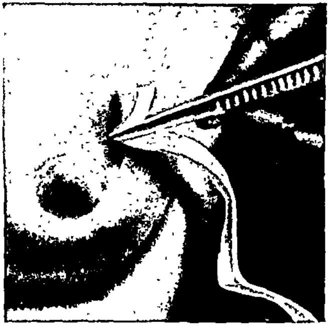

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Original Articles

The Intrahepatic Distribution of the Hepatic Artery in Man

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THE extrahepatic origin, course and branchings of the hepatic artery have been studied by numerous investigators: very few authors, however, have examined their ultimate distribution within the liver substance. From a surgical point of view there was little need for knowledge of the intrahepatic distribution of the hepatic artery, since surgery in the past was largely confined to the outer aspects of this organ. A lack of knowledge of the intrahepatic circulation soon became apparent, however, with the advocation of such operative procedures as hepatic ligation of the artery in the treatment of portal cirrhosis and partial hepatectomy for metastatic carcinoma.

Early contributors to the study of the intrahepatic course of the hepatic artery were Rex,[1] Segall[2] and Melnikoff.[3] The work of Rex was mainly on mammals other than man, while Segall and Melnikoff made their observations upon human livers. In none of the previous studies was any attempt made to organize the branchings of the hepatic artery into thei prevailing patterns. More recent Hjortsjö[4] and Elias and Petty[5] st-

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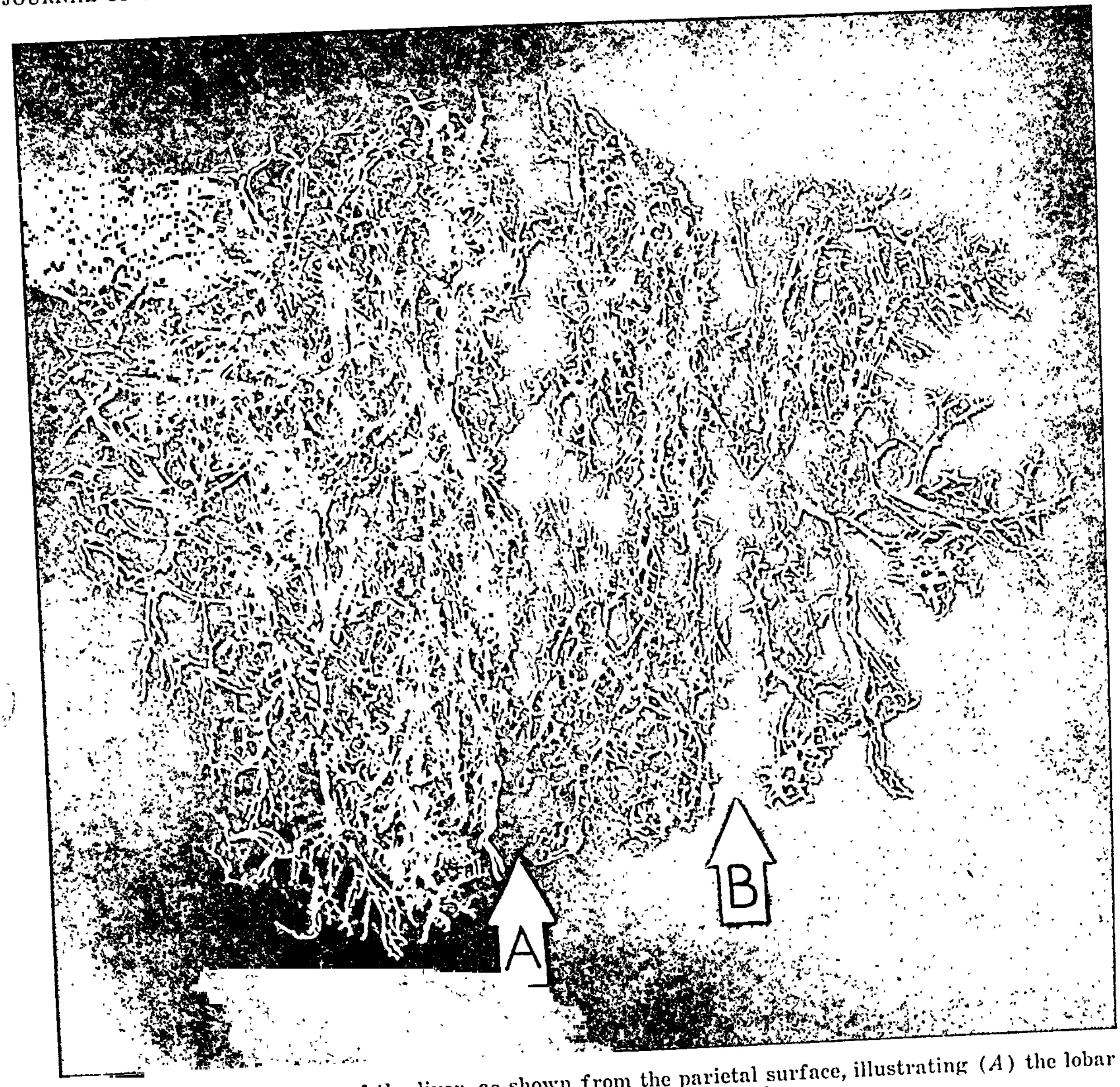

Fig. 1.—Vinyl acetate cast of the liver, as shown from the parietal surface, illustrating (*A*) the lobar fissure and (*B*) the left segmental fissure.

the hepatic arteries in human livers; the former author investigated only 10 specimens, the latter authors only 5. Conclusions drawn from such limited series must, of course, be accepted with reservation as to the conditions existent in a larger series.

After having studied the intraheptic course of the bile ducts in 100 human livers by means of the injection-corrosion technic and having verified Hjortsjö's concept of a segmental pattern of their branching, it became apparent to us that a pattern could also be established for the branching of the hepatic artery. In accordance with our observations of the branchings of the bile ducts,[6] we divided the liver into a right and a left lobe by means of a fissure seen in our casts—the lobar fissure (Fig. 1). This fissure could not be seen in the normal human liver but, on the visceral surface, corresponded to a line extending from the gallbladder fossa inferiorly to the fossa of the inferior vena cava superiorly. Such a division was first described by Cantlie[7] in 1898. In the casts, the right lobe was further divided by a right segmental fissure into an anterior and a posterior segment (Fig. 2). The left lobe was also divided by a fissure, the left segmental fissure (Fig. 1), which corresponded on the parietal surface to the attachment of the falciform ligament and on the visceral surface to a line running through the umbilical fossa below and through the fossa of the ligamentum venosum above. This fissure divided the left lobe into a lateral segment (that corresponds to the left lobe in the textbook descriptions of the liver) and into a medial segment. The latter corresponds in part to the quadrate lobe. Each of these segments in turn was divided into a superior and an inferior area (Fig. 3).

We have noted that the blood supply to these various parts of the liver follows a normal prevailing pattern comparable to that of the biliary passageways. Items specifically investigated with regard to the hepatic arteries were their segmental arrangement, intrahepatic distribution, and anatomic relation to the biliary ducts.

Materials and Method.—All of the liver specimens were obtained from adults at

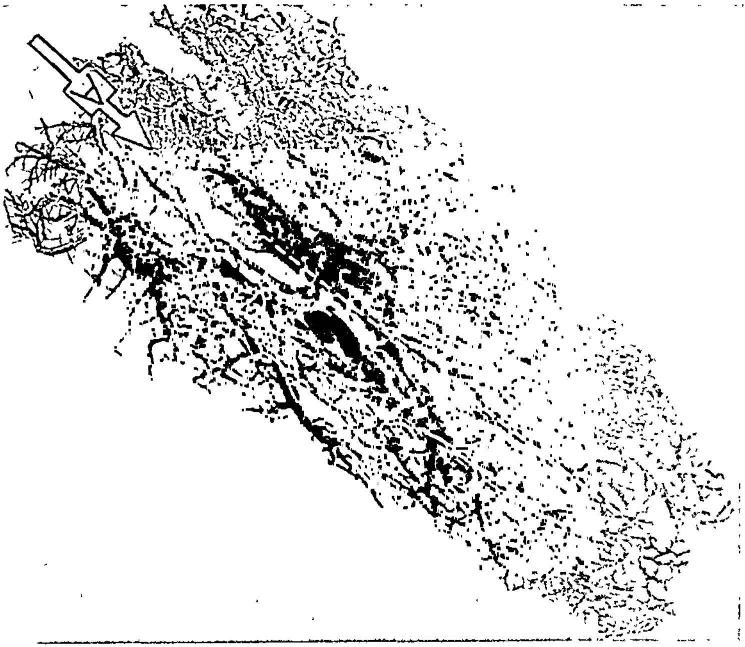

Fig. 2.—Photograph of a liver cast showing the right segmental fissure (indicated by arrow) as se when the right lobe is viewed from the right side. It divides the right lobe into an anterior segm which is to the upper right in the illustration, and a posterior segment, which is to the lower

autopsy. The biliary and arterial systems were injected with a solution of vinyl acetate in acetone. Mercury sulfide was added to the solution injected into the arteries. This material proved very suitable, since it gave a red color to the solution and was radiopaque. Roentgenograms were taken after the injections. The plastic having been allowed to harden, the liver was placed in a concentrated hydrochloric acid solution for twenty-four to thirty-six hours in order to corrode the hepatic parenchyma. The resultant casts were thereupon ready for study.

In this study we first made an attempt to follow the arteries only in those speci-

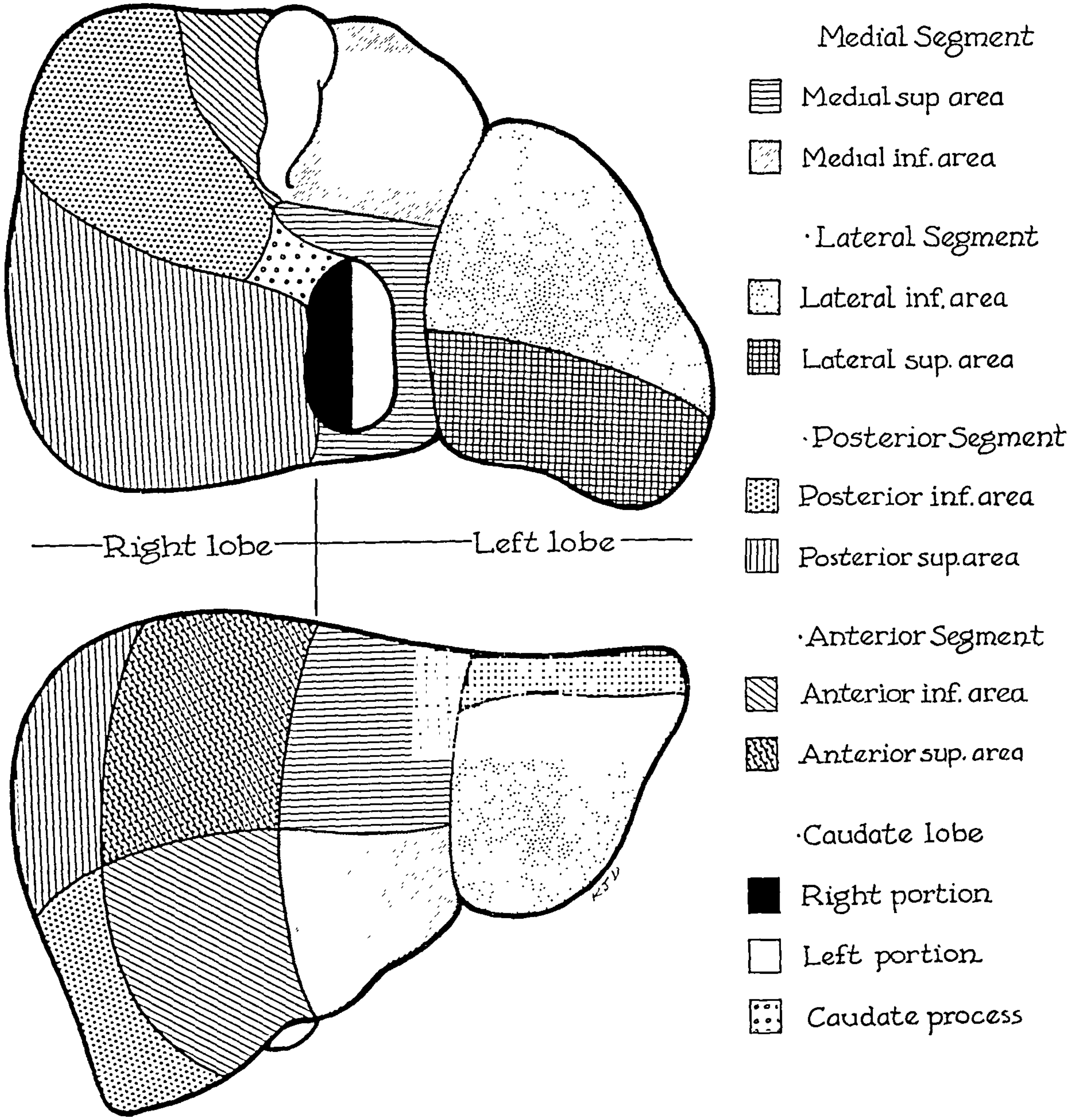

Fig. 3.—Divisions of the liver as based upon the biliary drainage of this organ. The visceral surface is shown in the upper drawing and the parietal surface in the lower.

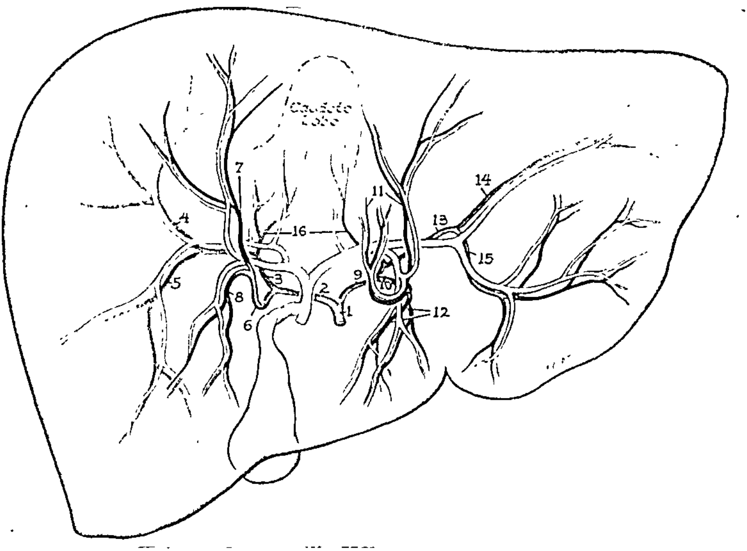

Fig. 4.—Composite drawing illustrating the prevailing pattern of branching of the hepatic artery. *1*, common hepatic artery; *2*, right hepatic artery; *3*, posterior segment artery; *4*, posterior-superior area artery; *5*, posterior-inferior area artery; *6*, anterior segment artery; *7*, anterior-superior area artery; *8*, anterior-inferior area artery; *9*, left hepatic artery; *10*, medial segment artery; *11*, medial-superior area arteries; *12*, medial-inferior area arteries; *13*, lateral segment artery; *14*, lateral-superior area artery; *15*, lateral-inferior area artery; *16*, caudate lobe arteries.

mens in which a single artery entered the hilus of the liver, for we wished to obtain a prevailing pattern of branching of the so-called normal or typical hepatic artery in contrast to the pattern observable in specimens having aberrant hepatic arteries. We were not concerned with the site of origin of the common hepatic artery, for this has already been extensively studied by other investigators. The second part of our study dealt with the intrahepatic arterial distribution in specimens in which more than one main hepatic artery was found supplying the liver.

The various systems, biliary and vascular, were examined in 150 adult livers. The hepatic arteries were injected in 70 specimens, 40 of which had a single hepatic artery entering the liver. The incidence of a single hepatic artery in this series of 70 casts is 57 per cent. This percentage corresponds favorably with that obtained by Michels,[8] who reported an incidence of 58.5 per cent in 200 bodies, using only extrahepatic dissection. In 30 specimens (43 per cent) more than one artery was observed supplying the liver.

Observations.—Common Hepatic Artery (a. hepatica propria): In all 40 specimens in which a single artery was present, the common hepatic artery was located in the hepatoduodenal ligament medial to the common hepatic duct and anterior to the portal vein. In its ascent it bifurcated into a right and a left branch, [illegible] [illegible]tion occurring at [illegible] where between the origin of the vessel and the porta hepatis, as shown by Segall.[2] When it divided near the porta, its division point was not in line with the lobar fissure (as was the case with the bifurcation of the common hepatic duct) but was situated to the left of this fissure. Because of this fact, the right hepatic artery was the longer of the two terminal branches (Fig. 4).

Blood Supply to the Right Lobe: 1. *Right Hepatic Artery.* After its origin from the common hepatic artery in the porta to the left of the common hepatic duct, the right hepatic artery coursed to the right behind the hepatic duct in 87 per cent of the specimens. In 11 per cent it passed in front of the duct. In its course to the right it came to lie below the right hepatic duct and usually did not exhibit a close relation to the latter. The right hepatic terminated by dividing into an anterior and a posterior segment artery (Fig. 4). This division may occur at variable sites; (a) in the hepatic parenchyma, (b) extrahepatically in the porta to the right of the common hepatic duct or rarely (c) extrahepatically to the left of the common hepatic duct.

2. *Posterior Segment Artery.* This artery was variable in its relation to the anterior segment artery in its origin from the common hepatic artery. In 52 per cent, of the specimens, however, it was superior to the anterior segment artery. Within the liver parenchyma, the posterior segment artery joined the duct of the same name and ran along its lower border and, like the duct, divided into a superior and an inferior area branch (Fig. 4).

Variations from this normal pattern of origin of the area arteries were observed in many instances. In 12 per cent of the specimens the superior area artery of the posterior segment arose from the anterior segment artery and in 2 per cent directly from the right hepatic artery. Predominantly (86 per cent) the superior area artery arose from the posterior segment artery as previously described. The posterior-inferior area artery usually (77 per cent) arose from the posterior segment artery (77 per cent) but in 20 per cent it arose from the anterior segment artery and in 3 per cent from the right hepatic artery.

3. *Anterior Segment Artery.* This artery was usually inferior in position at its site of origin from the right hepatic and in many cases followed a rather marked serpentine course. It is this artery that makes the well known caterpillar-like loop directed downward toward the gallbladder fossa, thereby placing this segment artery in an extremely vulnerable position during cholecystectomies. In the liver substance it joined the anterior segment bile duct, ran along its lower border and after a short course divided into a superior and an inferior area artery which accompanied similar branches of the duct (Fig. 4).

In most instances the anterior-superior area artery took origin from the anterior segment artery (87 per cent). It may, however, arise from the posterior segment artery (10 per cent) or, as in 1 case in this series, from the left hepatic artery. The anterior-inferior area artery arose from the anterior segment artery in 86 per cent and from the posterior segment artery in 14 per cent of the specimens.

It was noted in our observations of the hepatic ducts that in many cases (27 per cent) there was no union of the anterior and posterior segment bile ducts; consequently, no true right hepatic duct was present. From an extrahepatic dissection, one of these ducts would ordinarily be called an "accessory" right hepatic duct when actually it was an aberrant segment duct. We have observed 1 case in which a similar situation existed with regard to the arteries. Since in this specimen the anterior and posterior segment arteries arose separately from the common hepatic artery, no true right hepatic artery was present. Comparable arrangements have been reported in the literature, such as cases of double right hepatic arteries. There was an interesting relation in this case between these arteries and the common hepatic duct; the anterior segment

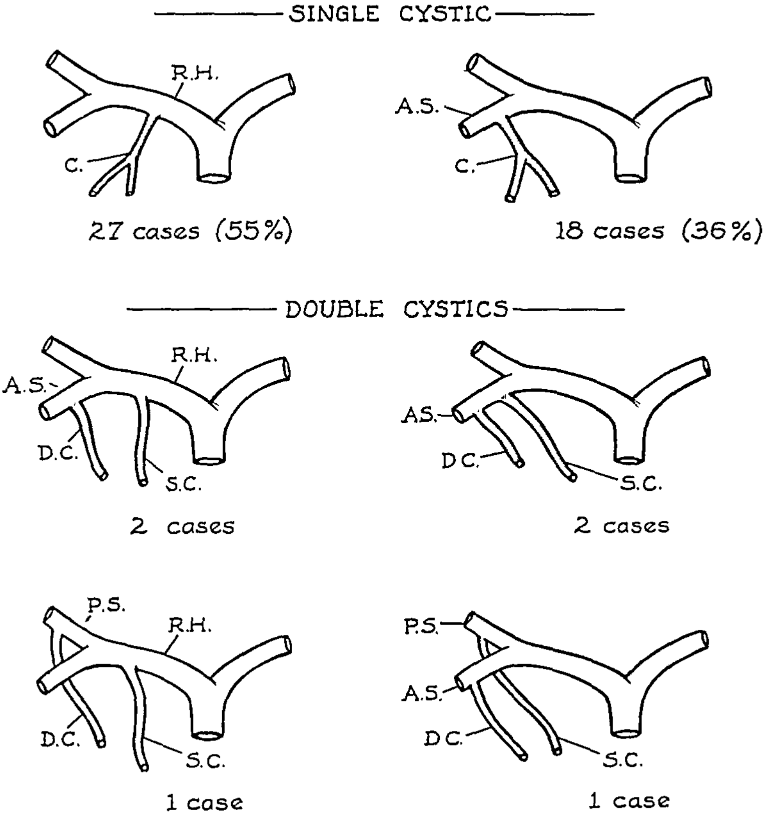

Fig. 5.—Illustration showing the various sites of origin of the cystic arteries in the liver casts. Note the frequency of the origin of the single cystic and the deep branch of the double cystic from the anterior segment artery. *RH*, right hepatic artery; *AS*, anterior segment artery; *PS*, posterior segment artery; *C*, cystic artery; *SC*, superficial cystic artery; *DC*, deep cystic artery.

artery passed in front of the duct, the posterior segment artery behind.

4. *Subvesical Artery.* We also pointed out, in our description of the hepatic bile ducts, that 35 per cent of our specimens showed a subvesical duct which was superficial in position in the gallbladder bed. In 25 specimens having such a duct the hepatic artery was injected as well, and in only 5 of these was this duct accompanied by a branch of the right hepatic artery. The accompanying artery, like the duct,

may be termed the subvesical artery. In 4 cases it arose from the anterior segment artery and in 1 case directly from the right hepatic.

5. *Cystic Artery*: It should be emphasized that in this study the diverse modes and sites of origin of the cystic artery (single or double) were not investigated. Data presented are restricted to those observed in the cast specimens in which the cystic arteries were injected. Of the 55 specimens in which this artery was injected, 49 had a single cystic artery. Most frequently it arose from the right hepatic (27 cases) and from the anterior segment artery (18 cases). Of the 6 cases in which a double cystic artery was observed, the various sites of origin of the superficial and deep branches are shown in Figure 5.

It has always been emphasized that the cystic artery is usually a branch of the right hepatic, but, as is evident from the illustration, the anterior segment artery is frequently the site of origin of the single cystic or the deep branch of the double cystic artery. This is quite evident when one takes into consideration the relation of the anterior segment artery to the gallbladder fossa.

Blood Supply to the Left Lobe.—1. *Left Hepatic Artery*: The left lobe may be divided into a medial and a lateral segment (the latter corresponding to the left lobe as described in the texts on gross anatomy). Since the common hepatic artery bifurcates into its two terminal branches to the left of the lobar fissure (i. e., in the region of the left lobe), the trunk of the left hepatic artery is considerably shorter than that of the right hepatic, this being due to the fact that it must almost immediately give of its segmental branches to the left lobe (Fig. 4).

As has been noted, the right hepatic artery usually did not have a close association with the right hepatic duct; so too, the left hepatic artery was usually situated well below the left hepatic duct. In only 1 instance did the common hepatic artery bifurcate sufficiently high in the porta to allow its left branch to be related to the upper border of the left hepatic duct. After its origin from the common hepatic, the left hepatic artery coursed obliquely upward and to the left for a short distance before it divided into its terminal branches (Fig. 4).

In 40 per cent of the specimens the branchings of the left hepatic artery followed the prevailing pattern of the branchings of the left hepatic duct, i. e., the artery terminated by dividing into a medial and a lateral segment artery. The bile ducts followed such a divisional pattern in 67 per cent of the cases. In 35 per cent of the casts examined, the left hepatic artery, instead of dividing into two segment arteries, divided early into the superior and inferior area arteries of the lateral segment. This type of division always occurred well to the right of the left segmental fissure in the porta hepatis. The medial segment artery in these cases arose from either the lateral - superior or the lateral-inferior area artery. A similar pattern was seen in the branchings of the left hepatic bile duct in 31 per cent of the casts. Finally, in 25 per cent of the specimens, the medial and lateral segment arteries arose separately from the common hepatic artery, and in these, therefore, no true left hepatic artery existed (Fig. 6). Only 2 cases were observed in previous studies in which there was no union of the medial and lateral segment bile ducts. From this observation it is interesting to note that, whereas on the right side separate segment ducts entered the common hepatic duct rather frequently (27 per cent), on the left side separate segment arteries arose from the common hepatic artery with comparable frequency (25 per cent).

2. *Medial Segment Artery*: Some authors have described this artery, which we call the medial segment artery, as a terminal branch of the common hepatic and designated it as the ramus media[9] or as the middle hepatic artery.[8] Although both of these authors regarded this artery as a terminal branch of the common hepatic, they described it as arising not

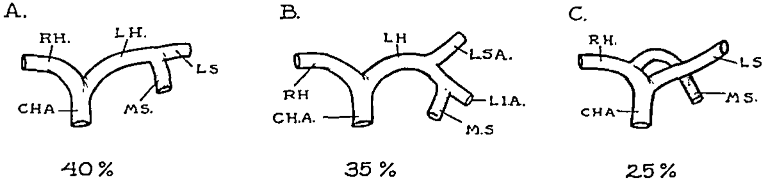

Fig. 6.—Variations in the branching of the left hepatic artery; *A*, into a medial and lateral segment artery; *B*, into a lateral-superior and a lateral-inferior area artery; *C*, absence of left hepatic with a separate origin of the segment arteries from the common hepatic artery.

directly from the latter, but from either the right or left hepatic artery. Others[10] have termed this branch, the quadrate lobe artery.

The medial segment artery usually (40 per cent) arose as a terminal branch of the left hepatic artery and coursed caudally into the substance of the medial segment. Unlike other segment arteries which gave off two area arteries, the medial segment artery gave rise to four area branches, i. e., two superior and two inferior (Fig. 4). At times this segment artery arose from the inferior or superior branch of the lateral segment artery, its origin from the lateral-inferior area artery being more frequent. Such a pattern was seen only in those cases in which the left hepatic artery terminated to the right of the left segmental fissure by dividing into a lateral-superior and a lateral-inferior area artery. The medial segment artery on no occasion arose from these area arteries to the left of the left segmental fissure. A third frequent source of origin of the medial segment artery was directly from the common hepatic (Fig. 6).

Just as one can distinguish four types of biliary drainage in the medial segment, so one can distinguish four types of arterial supply. These comprise: (a) Type I, in which the two inferior and the two superior area arteries arose from a single medial segment arterial trunk (70 per cent); (b) Type II, in which three of the four area arteries arose from a single trunk and one from a separate site (20 per cent); (c) Type III, in which the two superior and the two inferior arteries came off as separate trunks (5 per cent), and (d) Type IV, in which two of the area arteries arose separately and two from a common stem (5 per cent).

In addition to the branches just described, the medial segment artery may give off parenchymatous branches to the caudate lobe and subcapsular branches to the tissue in the region of the umbilical fossa.

3. *Lateral Segment Artery*: The lateral segment artery (one of the terminal branches of the left hepatic) ascended in the porta to gain a variable relation with the lateral segment bile duct, and ran along either its superior or its inferior border (Fig. 4). Extending to the left side of the porta, it usually (56 per cent) divided into its superior and inferior area branches in line with the left segmental fissure. The division rarely took place to the left of the fissure, i. e., within the lateral segment (3 cases). In 35 per cent, however, the lateral-superior and the lateral-inferior area arteries arose as terminal branches of the left hepatic to the right of the left segmental fissure. In the latter cases the medial segment artery may have arisen from one of the branches of the lateral segment artery rather than from the main left hepatic trunk.

The lateral-superior area artery extended obliquely upward toward the upper-outer angle of the lateral segment and at times extended beyond the liver parenchyma into the region of the appendix fibrosa, the latter lying between the leaf lets of the left triangular ligament. During its course through the lateral segment the artery was closely associated with the bile duct of the superior area of the lateral segment, either along its upper or its lower border (Fig. 4).

The lateral-inferior area artery descended into the lateral segment, curving toward the left, then turned upward, forming an arc. This course corresponds with that made by the bile duct of this area, the artery accompanying the duct along its inferior border (Fig. 4). Many of these casts showed subcapsular branches from the lateral segment artery or its area branches supplying the region of the umbilical fossa and the fossa for the ligamentum venosum.

Blood Supply to the Caudate Lobe: From an examination of the biliary drainage and the arterial supply of the caudate lobe of the liver, it is our opinion that it cannot be considered as belonging entirely to either the right or to the left lobe. The caudate lobe may be divided into a caudate lobe proper and a caudate process, the latter connecting the lobe to the right lobe of the liver. The caudate lobe proper, in accord with its biliary drainage, may be further divided into a right and a left portion (Fig. 3). In most cases each of these three parts (the caudate process and the right and left portions of the caudate lobe proper) is drained by a separate duct. A similar arterial pattern, i. e., three separate arteries to the lobe, was encoun-

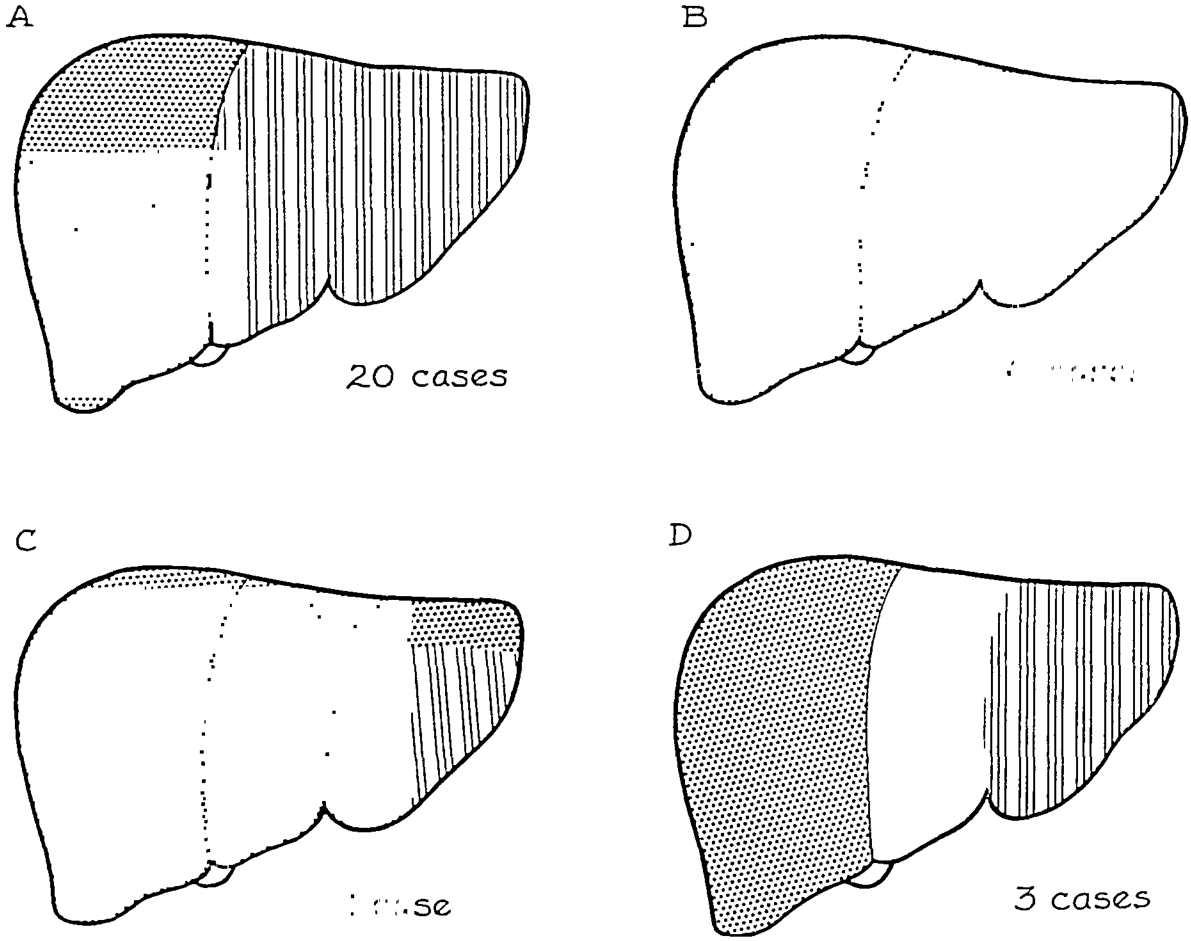

Fig. 7.—Diagrammatic representation of the various parts of the liver supplied by atypical hepatic arteries (see text).

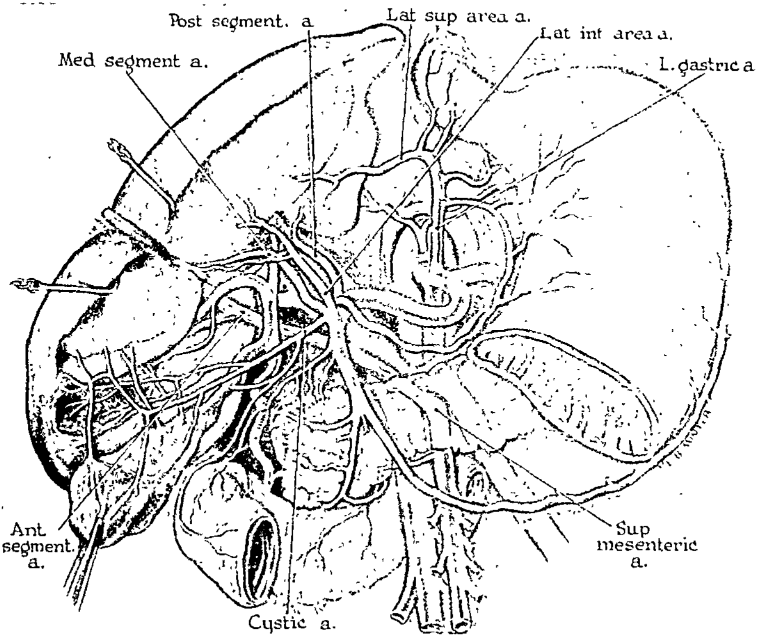

Fig. 8.—Extrahepatic cadaver dissection of a 64-year-old man. Five main arterial trunks supplied the liver, each supplying a very definite part of the organ.

tered in only 30 per cent of the casts. In 45 per cent only two arteries supplied the entire caudate lobe; i. e., the branch to the caudate process and the right portion of the caudate lobe proper arose as a common trunk, while the branch to the left portion was separate (Fig. 4). In 23 per cent a single trunk supplied the caudate lobe, and in 1 case four arteries were distributed to this lobe.

The origins of these caudate arteries were extremely variable. In one-half the specimens they arose from both the right and the left hepatic arteries or their branches (Fig. 4). The bile ducts draining this lobe drained into both right and left hepatic duct systems in 78 per cent. The caudate lobe was supplied entirely by the right hepatic artery in 35 per cent and entirely by the left hepatic in 12 per cent.

Atypical Hepatic Arteries: With the prevailing pattern of the branchings of the typical hepatic artery in mind, one can more readily understand the atypical or so-called aberrant hepatic arteries. As defined by Michels,[8] an aberrant hepatic artery is one arising from a source other than a typical celiac hepatic. Of these there are two types; a replaced hepatic, which is a substitute for the normal hepatic that is lacking, and an accessory hepatic which is additive to the one that is normally present. T

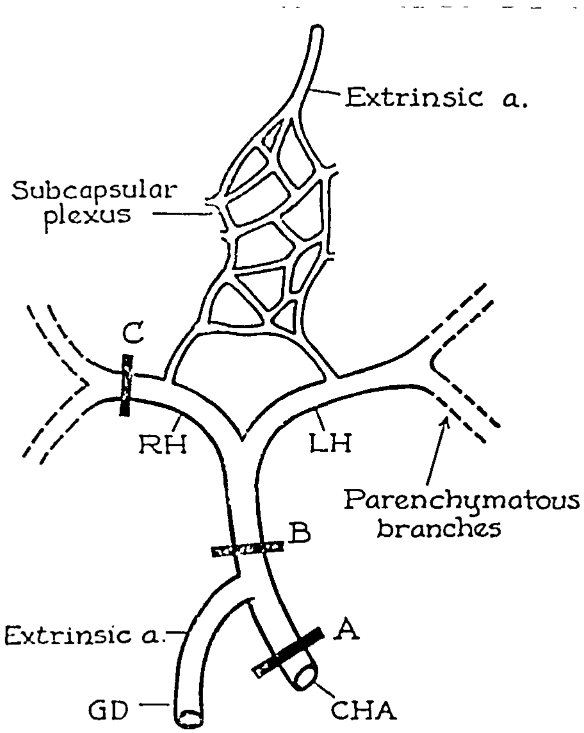

Fig. 9.--Collateral circulation to the liver after ligation of the hepatic artery (*A*) proximal to the gastroduodenal, (*B*) distal to the gastroduodenal and (*C*) beyond the origin of the subcapsular branches. The broken lines indicate the intrahepatic portions of the hepatic arteries.

was based upon observations by extrahepatic dissection. The term "accessory hepatic" gives one the impression that this artery is not only additive, but that it is supplying a part of the liver that is already supplied by a normal hepatic artery, and that therefore it is not essential. From the present intrahepatic studies it is quite obvious that this connotation of the term "accessory hepatic" artery is not accurate.

Decidedly important from a surgical point of view is the fact that, of the 70 specimens examined, 30 (43 per cent) had more than one main artery supplying the liver. The source of the aberrant arteries was not ascertained in this study, since our investigations were based upon excised specimens. In 27 of the 30 cases two separate arteries entered the porta, the pattern of the intrahepatic distribution being as follows: A. one artery supplied the entire right lobe (anterior and posterior segments); the other was distributed to the entire left lobe (medial and lateral segments) as shown in figure 7*A* (20 cases). One of these arteries as considered in an extrahepatic dissection could be classified as a replaced hepatic. B. One artery supplied the entire right lobe and the medial segment of the left lobe, whereas the other artery was distributed to the lateral segment (Fig. 7*B*). C. The larger of the two arteries supplied the right lobe and the major portion of the left lobe (including the medial segment and the superior area of the lateral segment). The smaller artery was distributed to the inferior area of the lateral segment (Fig. 7*C*). The latter artery could be considered, from an extrahepatic point of view, an accessory hepatic artery.

In 3 specimens the liver was supplied by three separate arteries. The largest of these entered the right lobe; of the remaining 2, 1 entered the medial segment of the left lobe and the other, the lateral segment (Fig. 7*D*).

From the data presented, one can see that replaced hepatic arteries are aberrant lobar arteries and that the so-called accessory arteries are either aberrant segment or area arteries. This conclusion is strikingly illustrated in the conditions observed by the senior author in a 64 year old male cadaver (Fig. 8). The common hepatic artery arose via a celiaco mesenteric trunk from the abdominal aorta, and gave rise to three arteries ascending to the liver. One of these arteries, as dissected extrahepatically, was classified as the left hepatic artery but actually supplied only the inferior area of the lateral segment as ascertained in the cast made of this liver. The second artery was distributed solely to the medial segment, and the third (which would be classed as the right hepatic as observed extrahepatically) supplied only the posterior segment of the right lobe. In addition to the three arteries derived from the celiac hepatic, there were two other hepatic arteries. One arose from the left gastric (an "accessory" left hepatic) and entered the superior area of the lateral segment; the other arose from the superior mesenteric (an "accessory" right hepatic) and entered the right lobe to supply the anterior segment of that lobe. Here then, was a case in which five main hepatic trunks supplied the liver; two segment arteries each with a different site of origin supplying the right lobe, a medial segment artery which arose separately from the common hepatic, and two *distinct area arteries which supplied the* lateral segment.

Anastomoses of the Hepatic Arteries: In our casts, anastomoses between the branches of the hepatic arteries were observed, but in all of these cases they were extrahepatic and small in caliber. Such anastomotic channels were encountered in 25 per cent of the specimens and consisted of communications located as follows: (a) in the region of the porta hepatis at the base of the caudate lobe (between the caudate lobe arteries and the medial segment artery or between two caudate arteries); (b) in the umbilical fossa (between branches of the medial and lateral segment arteries), and (c) on the right side of the porta (between the caudate arteries and the posterior segment artery of the right hepatic). No evidence was observed in our casts of any grossly visible anastomoses between the *parenchymatous* branches of the hepatic artery *within* the liver substance; the casts indicate that each segment artery supplied a specific part of the organ.

COMMENT

A great deal of controversy has existed for many years concerning the effect of ligation of the hepatic artery in man. One of the most controversial points is the importance of a collateral circulation in preventing necrosis of the liver after severance of its blood supply. One must distinguish whether these collateral channels are extrahepatic or intrahepatic. Von Haberer[11] was the first to emphasize the fact that the vitality of the liver depends upon the site of ligature of the hepatic artery. He found that a central ligation, i. e., one made proximal to the gastroduodenal artery (Fig. 9*A*), produced no change in the liver, the distal portion of the hepatic artery receiving its blood by numerous extrahepatic arterial pathways. Indeed, as shown by Michels,[12] there are some twenty-six possible extrahepatic collateral routes to the liver after a central ligation of the celiac artery has been effected. Ligature of the hepatic artery distal to the [illegible] as an innocuous a [illegible] Many discrepancies [illegible] with regard to the results of distal ligation of the hepatic artery in man. Some cases have been described in which extensive necrosis of the liver followed ligation of the hepatic artery beyond the gastroduodenal; other cases are reported in which survival followed such a procedure.[13] The vitality of the liver in the last-mentioned cases depends upon possible extrahepatic or intrahepatic collateral channels or, as claimed by many, upon the presence of "accessory" hepatic arteries. Such "accessory" arteries are actually parenchymatous branches to the liver, and, as has already been mentioned we noted no anastomoses between [illegible] within the liver [illegible] sory" arteries, therefore, do not communicate with the branches of the celiac hepatic artery intrahepatically, but are aberrant segment or area arteries supplying a definite part of the liver. They will be, then, of little value in collateral circulation after distal ligation of the celiac hepatic. Accordingly, if collateral channels exist, they must be located extrahepatically and must occur between branches of the hepatic artery (other than its parenchymatous branches) and certain extrinsic arteries; for example, the inferior phrenics.

In addition to the parenchymatous branches which we brought out in our casts, the hepatic artery gives off biliary rami to the bile ducts, the vasa vasorum to the vascular structures, and the subcapsular branches, which are profusely distributed to the fibrous capsule of the liver. It is the last-named branches which various authors have emphasized as important in certain extrahepatic anastomotic channels (Fig. 9). Actually little is known of these branches in man, and in this study we made no attempt to get our injection mass into all these subcapsular branches, for an injection of such proportions would have prevented us from seeing the forest because of the trees. Since, in these casts, we can account for the blood supply to the entire liver parenchyma as taking place via the parenchymatous arteries, we are inclined to the opinion that the subcapsular branches supply only the fibrous capsule and its extension into the liver. The constancy of these branches and their efficiency as communicating channels with extrinsic arteries remains to be determined. In many cases it is undoubtedly these arteries (especially those in the fossa of the ligamentum venosum), acting as collaterals between extrinsic arteries and the extrahepatic portions of the hepatic artery, that preserve the vitality of the liver after distal ligation of the celiac hepatic artery. If one ligates beyond the origin of these arteries from the hepatics, their role as collaterals will be nil (Fig. 9*C*). In other words, we agree with the conclusions of Graham and Cannell[14] that the prospect of liver necrosis increases steadily as the point of ligation of the hepatic artery moves toward the periphery. From the evidence presented by these intrahepatic studies it is our opinion that, in the *normal* liver, ligation of a segment artery will result in complete deprivation of arterial blood to the segment of hepatic parenchyma which it supplies.

SUMMARY

1. The intrahepatic distribution of the hepatic artery was studied in 70 specimens, 40 of which had a single hepatic artery supplying the liver, while 30 had more than one hepatic artery.

2. The prevailing pattern of branching of the hepatic arteries was found to be similar to that of the bile ducts in that there was a segmental distribution.

3. The arteries within the liver parenchyma closely followed the bile ducts, whereas extrahepatically no such coordination exists.

4. The so-called "accessory" hepatic arteries were found to be aberrant segment or area arteries supplying a definite part of the liver substance, and did not anastomose with branches of the celiac hepatic arteries.

5. The anterior segment artery has been emphasized as a frequent source of origin of a single cystic artery or the deep branch of a double cystic artery.

6. Although variations in the origin of the segment bile ducts were more frequently observed on the right side, variations in the origin of the segment arteries were more frequently observed on the left side.

7. No evidence was found of any gross intrahepatic anastomoses between the parenchymatous branches of the hepatic artery; however, in 25 per cent of the specimens small anastomotic channels were seen connecting the right and left branches. These were all extrahepatic and subcapsular and very small.

RÉSUMÉ

1. Les auteurs étudient la circulation de l'artére hépatique chez 70 spécimens; 40 d'entre eux, n'avaient qu'une seule artére; tandis que les 30 autres en avaient plus d'une.

2. La division de l'artère s'apparente à la division des canaux biliaries dans chaque cas.

3. Dans le parenchyme, les artères suivent les canaux biliaires; il n'en est pas ainsi en dehors du foie.

4. Les artéres hépatiques accessoires déservent une région particulière et ne s'anastomosent pas avec les branches de l'artère hépatique coeliaque.

5. L'artère du segment antérieur a été acceptée comme le tronc initial d'une artère unique ou comme les branches profondes d'une artère cystique double.

6. Il n'y a pas de différences notables quant anx côtés.

7. Aucune anastomose intra-hépatique entre les branches de l'artère hépatique ne fut trouvée. Toutefois 25% des cas présentèrent de petites anastomose entre les branches droites et gauches. Elles étainet petites et en dehors du parenchyme sous-capsulaire.

SUMARIO

1. Os autôres procederam um interessante estudo sôbre o comportamento intrahepatico da arteria hepatica, observando 70 cadaveres, em 40 dos quais encontraram uma só arteria suprindo a circulação do figado, enquanto nos 30 restantes foram encontradas mais de uma arteria hepatica.

2. Prevaleceu um modêlo de ramificação da arteria hepatica muito semelhante em sua distribuição aquela observada quanto aos canais biliares.

3. As arterias quando dentro do parenquima hepatico, acompanham os canais biliares, não existindo essa coordenação quando se tornam extra-hepaticas.

4. As chamadas arterias hepaticas accessórias foram encontradas como sendo segmentos aberrantes irrigando uma parte bem definida do parenquima hepatico, não se anastomosando com os ramos celiacos da arteria hepatica.

5. O segmento anterior da arteria tem sido salientado, frequentemente, como origem da arteria cistica, ou como ramo profundo de uma dupla arteria cistica.

6. Registraram, mais frequentemente, para o lado direito as perturbações de origem dos canais biliares, e para a região esquerda as variações na origem dos segmentos arteriais.

7. Não encontraram os autôres indicio da existencia de qualquer pronunciada anastomose intra-hepatica entre os ramos parenquimatosos da arteria hepatica; todavia, em 25% dos casos, pequenas anastomoses (canaliculos) foram vistas reunindo os ramos direito e esquerdo da arteria. Estes eram, entretanto, muito pequenos, extra-hepaticos e sub-capsulares.

RESUMEN

1. En 70 especímenes se estudió la distribución intrahepática de la arteria hepática, 40 de ellos tenían una sola arteria hepática vascularizando al hígado, mientras que 30 tenían mas de una.

2. El tipo dominante de disposición de las arterias hepáticas se encontró semejante al de los conductos biliares en relación a la distribución sebmentaria.

3. Las arterias dentro del parenquima hepático siguieron de cerca los conductos biliares, mientras que las extrahepáticas no mostraron dicha relación.

4. Las llamadas arterias hepáticas accesorias se encontraron ser un segmento ó área aberrante de arterias vascularizando una parte definida de substancia hepática y no anastomosadas con ramas de las arterias hepáticas celíacas.

5. El segmento anterior de la arteria ha sido emfatizado como fuente de origen frecuente de la arteria cística única ó la rama profunda de la arteria cística doble.

6. Aun cuando en el lado derecho se observaron más frecuentemente variaciones en el origen de los conductos biliares, en el izquierdo se observaron más frecuentemente las variaciones en el origen de las arterias.

7. No se encontró evidencia de ninguna anastomosis intrahepática gruesa entre las ramas parenquimatosas de la arteria hepática; sin embrago, en 25 por ciento de los casos se vieron pequeñas anastomosis conectando las ramas derechas é izquierdas. Todas ellas fueron extrahepáticas, extracápsulares y muy pequeñas.

ZUSAMMENFASSUNG

1. Die Verzweigung der Leberarterie innerhalb der Leber wurde an 70 Präparaten untersucht; 40 davon hatten eine einzige Leberarterie, die das ganze Organ versorgte, während die restlichen 30 mehr als eine Schlagader aufwiesen.

2. Das vorwiegende Muster der Verzweigung der Leberarterien zeigte eine segmentale Verteilung, die Aehnlichkeiten mit der Aufsplitterung der Gallengänge aufwies.

3. Innerhalb der Leber folgen die Schlagadern dem Verlauf der Gallengänge, während ausserhalb der Leber keine derartige Beziehung besteht.

4. Die sogenannten "akzessorischen" Leberarterien erwiesen sich als abwegige Segment- oder Zonenarterien, die ein bestimmtes Gebiet des Lebergewebes versorgen und keine Anastomosen mit den Aesten der zöliakalen Leberarterien haben.

5. Es wird hervorgehoben, dass die Arterie des vordenen Segments häufig die Quelle einer einzelnen oder des tiefen Zweiges einer doppelten Gallenblasenarterie bildet.

6. Während Variationen im Ursprung der segmentären Gallengänge häufiger auf der rechten Seite beobachtet werden, kommen Abweichungen im Ursprung der segmentären Schlagadern häufiger auf der linken Seite vor.

7. Die Verfasser fanden keinerlei grössere intrahepatische Anastomosen zwischen den parenchymatösen Aesten der Leberarterie; dagen wurden in 25% der Präparate zarte Verbindungskanäle zwischen den Aesten der rechten und der linken Seite beobachtet. Diese waren alle extrahepatisch und unterhalb der Kapsel gelegen und von sehr engem Kaliber.

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Foreign Interns and Residents Available

Approved hospitals in the United States and Canada have openings for interns and residents are requested to communicate with the Secretariat of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Modern Conceptions of Prostatic Obstruction

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ON March 10, 1944, the Honorable Winston Churchill (now Sir Winston), in an address before the Royal College of Physicians in London, said, "The longer you look back the farther you can look forward."

Democritus concisely expressed the underlying spirit of the medical sciences when he said "Nothing is permanent but change." The truth of this aphorism is revealed in the changes that have occurred in the surgical treatment of prostatic obstruction. In one hundred years there has been a complete cycle in the development of methods of surgical intervention in the handling of various lesions about the vesical neck. This cycle may be arbitrarily divided into three periods. In the first period, perurethral manipulation was advocated as the most practical procedure. In the second, open operations, either abdominal or perineal, became popular. In the third period, the endoscopic route is slowly gaining in favor.

The early symptoms of prostatic obstruction is deviation from normal micturition. Although the micturition reflex has been intensively studied, unanimity of opinion is still lacking. This variance is explained by the difficulty of accurate correlation of the physiologic mechanism of urination in animals with the same element in man, since micturition in animals is not as completely under the control of the will as in man. However, the experiments of Dennig, Barrington, Graves and Davidoff, the cystometric studies of Rose on the human subjects, and the neurosurgical procedures of Learmonth have done much to elucidate the function of the bladder in health and in disease.

Obstruction to the outflow of urine, especially by an obstacle such as a deformed or enlarged prostate, has a definite tendency to disturb the functional balance of the controlling innervation of the bladder. With similar degress of obstruction the symptomatic response will depend to a great extent upon the viscerogenic reflexes of the automatic controlling factors of the mechanism of urination.

The urinary bladder in man is essentially a muscular organ whose functions are storage and periodic discharge of the renal secretion. Its musculature consists of three layers of muscle fibers, which are intimately interwoven, so that the entire musculature constitutes a functional unit, the detrusor urinae muscle.

The nervous control of the urinary bladder is mostly reflex, depending on an intricate nervous mechanism. Three sets of nerves reach the bladder and its sphincter. Two of these sets belong to the autonomic system and the third to the somatic system. The double nerve supply from the autonomic system is made of sympathetic and parasympathetic fibers, the former coming from the thoracolumbar outflow, culminating in the hypagastric nerves, the latter from the sacral outflow, forming the pelvic nerves. The somatic representative, which has to do with voluntary sphincter control, is found in the pudic nerves.

Recent physiologic work has shown that section of the pudic nerves results only in imperfect closure of the external sphincter and some loss of urethral sensitivity, but does not materially disturb the normal function of the bladder. Section of the hypogastric nerves, either alone or in addition to the pudic nerves, does not result in significant change in bladder function in normal persons. Section of the pelvic nerves, however, brings about profound, functional and trophic disturbances of the bladder. Stimulation of the pelvic nerves elicits relaxation of the sphincter

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mechanism and contraction of the detrousor muscle, resulting in expulsion of the contents of the bladder; stimulation of the the hypogastric nerves brings about increased tonus of the internal sphincter and relaxation of the detrusor muscle. In general, the sympathetic and parasympathetic innervation of the bladder may therefore be regarded as mutually antagonistic. The smpathetic nerves, taken as a whole, are the filling nerves of the bladder, while the parasympathetic group are the emptying nerves of the bladder.

There are still many questions to the physiologic mechanisms of the filling bladder and the micturition reflex that remain in dispute. The generally accepted theories and established facts may be summarized as follows: The bladder is a viscus in which the phenomenon of tone plays an important role. The bladder does not fill passively like a toneless sac. This postural activity is so adapted that it maintains in the bladder cavity up to its optimum capacity the same intravesical tension with varying volumes of urine. In other words, the bladder wall adapts itself to its contents, keeping the intravesical pressure constantly at a level of about 150 mm. of water. The bladder exhibits a distinct muscular activity during its filling. This is shown by rhythmic wavelike contractions that occur during the filling process. Starting with the apparently empty bladder at the normal pressure of 150 mm. of water, the urine enters from the ureters and slowly accumulates. The response of the vesical musculature to the slow accumulation of urine has been described concisely by Graves and Davidoff.

"In the period of rhythmic activity the muscle fibres are lengthened as the filling proceeds. The intermittent contractions represent a sort of clonic response to the stimulus of stretching or distention. Later, further distention is further resisted and the state of tonic sustained contraction is reached. It is in this state that pressure within the bladder rapidly rises. In other words, the bladder at first apparently responds to the gradual filling, isotonicly, that is, by increasing the length of the muscle fibres without materially changing the tension. Finally, when a sufficient quantity has accumulated, the response becomes isometric; the fibres maintain the same length and respond to the stretching force by a rapidly increasing intravesical tension."

It can now be understood why the pressure gradient does not increase during the period of rhythmic contraction as the urine collects, because the muscle fibers of the bladder are actively elongated, thus increasing the bladder's capacity. This adaptation of the bladder to its increasing contents is carried on reflexly through its sympathetic control, which causes the bladder wall to relax and at the same time reinforces the closure of the sphincter. However, when about 250 cc. of urine has been secreted the intravescial pressure rises suddenly, since the muscle fibers of the detrusor resist further elongation. When the pressure has reached about 180 mm. of water, afferent impulses are set up which travel by the parasympathetic outflow to the higher centers. In these centers these impulses are translated into a desire to micturate. If it is inconvenient to do so, impulses from the cerebral cortex act through the sympathetic fibers and further relax the bladder and tighten the sphincter. As the capacity of the organ is in this manner increased, the internal pressure falls again to the normal 150 mm. level; as a result the efferent impulses through the parasympathetic nerves cease and the desire to urinate temporarily passes. This is a remarkable example of a conditioned reflex due to the demands of modern civilization. In those persons who have definite hyperactivity of the sympathetic nerves the bladder may become accustomed to accommodate large quantities of urine before its fibers fail to relax and allow a rise of intravesical pressure to take place.

The actual mechanism of evacuation of the bladder is carried on by impulses from the cortex which stimulate the parasympathetic nerves, which in turn contact the bladder wall and relax the sphincter. Certain accessory muscles are frequently involved in emptying the bladder. The abdominal wall contracts, the diaphragm descends, and the breath is held with the glottis closed. The resultant rise of intraabdominal pressure compresses the bladder from without, and then the intravesical pressure rises to about 300 mm. of water and the bladder is evacuated. Of course micturition can be voluntarily carried out before urgent afferent impulses have been received. This occurs especially in those who have parasympathetic predominance in the nervous control of the bladder. In this type the power of the bladder to elongate its fibers is held in abeyance, and as a result the capacity, although normal for that person, is much below that of the opposite type with sympathetic preponderance. It follows, then, from these general considerations, that the type of functional activity in the normal human bladder depends largely upon the balance between the antagonistic actions of the sympathetic and parasympathetic division of the autonomic nervous system. Appreciation of this observation has led Graves to designate the bladder with hyperactive parasympathetic control as active, and the bladder with sympathetic overactivity as passive. Graves, in his study of bladder regurgitation, has shown that only the active bladder in the presence of obstruction of the vesical neck permits reflux up the ureters, while the passive bladder never does. This important clinical observation demonstrates that the exaggerated sympathetic tonus of the passive bladder tolerates extreme dilatation of the bladder itself, without danger of reflux up the ureters. This confirms the experimental evidence that stimulation of the vesical sympathetic fibers produces relaxation of the detrusor and at the same time contraction of the sphincter-like mechanism of the ureterovesical orifices as well as the internal sphincter. In the active bladder with its enhanced parasympathetic control, however, the inhibited ureterovesical valves offer but little resistance to regurgitation up the ureters, particularly in the presence of obstruction at the natural outlet.

Patients with a preponderance of parasympathetic control differ clinically in many ways from those with sympathetic predominance. In those patients who in health show no evidence of imbalance of the dual autonomic factors of micturition, the obstructing prostate produces only a temporary upset of bladder function. Owing to the stability of the bladder reflexes in this group, the tendency is toward reestablishment of normal urinary function as soon as the acute obstructive lesion has been mitigated.

Clinically, three groups of bladder activity have been recognized for many years, but the role of the autonomic nervous system in the production of these has not been appreciated until lately. As far back as 1910, Kidd differentiated three distinct clinical types of prostatic symptoms. He classified them, moreover, according to their symptoms of onset, as follows: (1) the irritable bladder type, (2) the painful retention type and (3) the painless incontinence type. This symptomatic classification is both practical and important, since it places emphasis on the early symptom complexes of each group.

In the light of present knowledge of the neurophysiologic background of vesical hydromechanics one is able to understand the reason for these totally different reactions to a similar etiologic factor. The clinicopathologic course of the "irritable bladder" group can be accounted for by parasympathetic predominance. The "painless incontinence" type represents the group with sympathetic hyperreactivity. The "painful retention" type is a sequel of the effect of acute obstruction upon a bladder in which the innervation is perfectly balanced.

Let us first consider the "irritable bladder" type, since this group comprises the majority of those who suffer with prostatism. As its name indicates, the symptoms of onset are referable to irritability of the bladder, which is first shown by frequency of micturition. This frequency can be explained on the basis of the modern physiologic conception of urination. It has been stated that intravesical tension and the desire to void follow parallel oscillations. As a result of mechanical obstruction at the outlet, there is a tendency for overstretching of the bladder wall, which in turn acts as a stimulus to growth, resulting in hypertrophy of its fibers. This hypertrophy gradually increases so as to enable the expulsive force of the bladder to overcome the obstruction: it increases bladder tone, so that the micturition pressure of 180 mm. will be reached before the normal amount of urine has accumulated. Since pressure, not quantity, produces the desire to void, the amount of urine to set up afferent impulses becomes correspondingly smaller, and, hence frequency gradually increases. In this group the parasympatheticotonia inhibits relaxation of the bladder, and in this way tends to aggravate the frequency, so that dysuric symptoms eventually develop. Ultimately, when the expulsive power of the bladder begins to fail, decompensation occurs, resulting in incomplete evacuation of the bladder, with the consequent accumulation of residual urine. At this time the patient notices prolongation of the act of urination, diminution in the voiding distance (owing to impairment of force) and a gradual decrement in the caliber of the stream due to actual narrowing of the posterior portion of the urethra. The residual urine tends to produce excessive stretching of the bladder wall, in consequence of which its nutrition suffers, lowering the tissue resistance to infection. Infection is readily precipitated by the presence of the stagnant residual urine, and finally cystitis and pyelonephritis develop. The inflammation of the bladder mucosa converts the frequency into an urgency that generally terminates in complete painful retention.

The development of pylonephritis in these active bladders is due to the ease with which urinary reflux occurs. The inhibitory effect of the parasympathetic nerves on the ureterovesical orifices, combined with obstruction of the vesical neck, forces the infected urine up the ureters practically at every effort to void. Early relief of obstruction is essential to prevention of this disastrous complication.

The sequence of events in the "painless incontinence" type is entirely different. In this group of passive bladders the preponderance of sympathetic nerve control produces a vicious circle. The dilatable atonic bladder, with its spastic sphincter, places the patient at a decided disadvantage. Little anatomic obstruction is required to produce high grades of urinary obstruction with grave results. In this group obstructive lesions of the prostate are insidious in onset and progress silently before the appearance of true symptoms referable to the lower portion of the urinary tract. The patient is entirely unaware of his inability to empty his bladder completely, he has no sense of discomfort, in spite of a chronically distended, palpable bladder easily recognized by percussion and palpation. Although disorders of urination are present, they are in the background as far as subjective symptoms are concerned. In fact, some of these patients maintain that they have no difficulty in voiding, complaining only that they have some dribbling at times. Urination in this sympatheticotonic group becomes a mere overflow, because the rhythmic contractions of the bladder which has become accustomed to accommodate large quantities of urine are not of sufficient intensity to set up proper afferent stimuli. The escape of urine, then, is chiefly due to overflow from an overfilled organ. In this passive bladder there is no urinary reflux, but there is severe stasis in the upper part of the urinary tract as a result of the coincident ureteral and pelvic dilatation. This dilatation of the upper part of the tract represents the general lack of tone produced by the overacting sympathetics aggravated by the stasis in the lower part. The dilatation of the renal pelves gradually leads to destruction of the parenchyma of the kidney, with nitrogen retention in the blood. The principal symptoms, then, in this sympatheticotonic group are referable to the gastrointestinal, cardiovascular and nervous systems. They vary in accordance with the degree of renal insufficiency, and tend to hasten the normal degenerative changes of the aging patient. Sudden decompression of the bladder in this group may lead to death from uremia.

The "painful retention" type is described by Kidd as follows:

> "A man of 50 or 60, in the best of health, discovers that he is unable to pass his water. After a few hours he is taken with painful cramps in the hypogastric region, and an intense desire to pass water, but he can effect nothing, and becoming alarmed he sends for the doctor. A dose of morphine and a hot bath are all that is required, although resort must be had to the catheter if this treatment fails, and the difficulty disappears for the time being, perhaps for six months or a year. These attacks are repeated at lessening intervals until the retention may be complete and permanent, so that regular catheterization becomes an established necessity. They appear to be produced by a condition of congestion of the prostatic urethra and spasm of the sphincter apparatus, shut up by irritation, cold, or alcohol or by a mild bacterial invasion of the prostatic urethra. They are painful because the bladder muscle is in good condition and able to undergo cramping contractions."

Randall has stated that this type of re*tention is always associated with bilateral* lobar hypertrophy. I should like to add that a properly balanced autonomic nerve control is the second essential.

Clinical experience has shown that many men who have definite hypertrophy of the prostate gland, as demonstrated by rectal palpation, do not have symptoms or signs of urinary obstruction and, conversely, many others who have no enlargement of the prostate gland that can be verified by rectal examination have various degrees of urinary blockage. Therefore, it is the amount of obstruction at the neck of the bladder to the urinary egress, rather than the size of the gland, that causes symptoms.

While it is true that prostatic palpation alone cannot be depended upon in the diagnosis of prostatic obstruction, it is essential that a rectal examination should be a routine step in the physical examination of all male patients, especially those beyond the age of 50. Seventy-five per cent of prostatic cancers can be readily detected by the examining finger. The typical nodulation, the definite fixation and the peculiar induration, once felt, can never be forgotten.

Although the tubular character and the small diameter of the urethra are well known, few appreciate that a relatively small amount of prostatic tissue actually causes the blockage. Furthermore, the entire gland cannot take part in the production of the obstruction, owing to its peculiar anatomic configuration.

Electroresection of the prostate gland is one of the most important surgical improvements of this century. It utilizes the marvelous biophysical and biochemical developments that have arisen from the ancillary physical and chemical sciences.

Prostatectomy *per urethra* is an art that requires intensive perseverence, marked enthusiasm, much facilitation and modern technical equipment. No longer should the gland be graded; it is more important now to grade the surgeon.

However, even in the hands of those who are adept there are many pitfalls. Although the mortality and morbidity *rates associated with prostatic resection* is lower than that of the other methods of removal, statistical studies in the larger American clinics make it clear that this operation must be considered a major procedure. Paraphrasing Winston Churchill's stirring message on "blood, sweat and tears" after Dunkirk, one may well say that "Blood from the prostatic resection involves blood from the patient, sweat from the surgeon and tears from the relatives."

Complete preoperative urologic investigation is more essential to the transurethral operation than to any open procedure, because people believe it is not a serious procedure. Nonresectionists belittle this operation, saying that it is always inadequate and only palliative. This is not true! Complete prostatectomy *per urethra* is as practical as suprapubic, retropubic or perineal prostatectomy.

The present transurethral methods correcting pathologi s of t prostatic portion greatly, however, from those used in the early period of endoscopic surgery. Not until the evolution of the collateral sciences which provided accurate optical and sensitive electrical equipment have surgeons been able to achieve their present progress in the management of the obstructing prostate. Refinement in the construction of endoscopic instruments and application of new electrophysical principles, together with increased knowledge of the biochemistry and the physiology of the urinary system, have combined to make possible the present advance in electrical resection of the prostate.

The ideal of all surgery is the preservation of anatomic parts in their normal relation. This is actually obtained by the transurethral method. It seems unjustifiable to perform a major operation—either suprapubic or perineal prostatectomy—when it is necessary only to remove a relatively small amount of tissue from a fairly accessible site. The simple removal of the obstructing tissue, rather than the entire gland, is based on sound principles. Thus, Randall, in his painstaking statistical study of the pathologic anatomy of prostatic obstruction, has pointed out that the majority (94 per cent in his series) of lesions of the prostate gland are benign. Prostatic resection is less confining than classic prostatectomy. Physicians can now recommend the procedure to patients for whom in the past they have been inclined to advise delay. Further, this procedure commends itself to elderly men, owing to their antipathy towards major surgical procedures at their age.

Exactly one hundred years have passed since Guthrie, the pioneer of transurethral surgery, in a lecture in London, advocated the treatment of prostatic bars at the neck of the bladder by incision with a knife blade projected from a catheter. By a process of slow evolution from this basic idea, the Stern-McCarthy visual prostatome has developed, with its exquisite control, accurate vision and tremendous possibilities.

SUMMARY

The physiologic and neural mechanisms that control micturition are described in detail in relation to prostatic obstruction, of which deviations from normal micturition is the earliest symptom. The author recommends Kidd's classification of urinary symptoms of prostatic disease into three types: the "irritable bladder" type, the "painful retention" type and the "painless incontinence" type. The physiopathologic background of each is described. The author's advocacy of prostatic resection per *urethra* is explained on the basis of the facts here presented.

ZUSAMMENFASSUNG

Die physiologischen und nervösen Mechanismen, die die Harnausscheidung kontrollieren, werden in ihren Beziehungen zur prostatischen Obstruktion, wo die Abweichung von normaler Urinierung das frühste Symptom darstellt, im einzelnen beschrieben. Der Verfasser empfiehlt die Klassifizierung von Kidd, der die Harnsymptome der Prostataerkrankung in drei Arten einteilt: die "Reizblase," die schmerzhafte Harnverhaltung, und die "schmerzlose Inkontinenz". Die physiopathologischen Grundlagen jeder dieser drei Formen werden beschrieben. Der Verfasser setzt sich für die transurethrale Resektion der Prostata ein und begründet seinen Standpunkt mit den hier dargestellten Tatbeständen.

SUMARIO

O autôr descreve no seu trabalho o mecanismo fisiologico e neurogêno de contrôle da micção, especialmente no que tange aos casos de obstrução prostática. E recomendada a classificação de Kidd a respeito dos sintômas urinarios da doença prostatica: "bexiga irritada," "retencão dolorosa" e "incontinencia doloerosa." O autêr defende as resseção trans-uretrais da prostata. Tomando por base os fatos delineados em seu trabalho.

RIASSUNTO

Viene descritto dettagliatamente il meccanismo fisiologico e nervoso della minizione in rapporto con la ostruzione prostatica, affezione nella quale la disuria rappresenta il primo sintomo. L'autore approva *la classificazione di Kidd, che distinse tre* tipi di disturbi urinarii nelle malattie della prostata: la "vescica irritabile," la "ritenzione dolorosa" e la "incontinenza senza dolore." Descrisse il substrato fisiopatologico di ognuno di questi tipi e spiega, infine, la sua preferenza per la resezione transuretrale della prostata sulla scorta dei dati di fatto ricordati.

RESUMEN

Se describen los mecanismos fisiológicos y nerviosos que regulan al micción en relación con la obstrucción prostática, en la cual la anormalidad en la micción es uno *de los síntomas más tempranos. El autor* recomienda la clasificación de Kidd para los síntomas urinarios de la enfermedad prostática en tres tipos: el tipo de "la vejiga irritada," el tipo de "la retención dolorosa" y el tipo de "la incontinencia indolora." Se describe el fondo fisiológico de cada una. El autor preconiza la resección prostática per uretra lo que se explica en base a los hallazgos aquí presentados.

RÉSUMÈ

L'auteur décrit le phénomène physiologique et nerveux de la miction en rapport avec l'obstruction par hypertrophie de la prostate. L'auteur suggère la classification de Kidd pour l'hypertrophie prostatique à savoir: la vessie irritable, la vessie en rétention et l'incontinence non douloureuse. Chaque cas est étudié. L'auteur suggère la prostatectomie trans-uréthrale comme opération de choix.

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Qualifying Examinations for Fellowship in the United States Section of the International College of Surgeons will be held on November 2 and 3, 1953. The examinations will be given at Cook County Graduate School of Medicine and the Cook County Hospital. Applicants are requested to address communications to Dr. Harry A. Oberhelman, Secretary, Examination and Qualification Council, 1516 Lake Shore Drive, Chicago 10, Ill.

Continuous Bath Treatment in Surgical Therapy

ROBERT JELINEK, M.D., F.I.C.S.
VIENNA, AUSTRIA

THE continuous bath treatment was developed by the Viennese dermatologist Hebra in the year 1861. He intended to use it for the treatment of smallpox, but the results did not justify his expectations. Since then, many and various diseases have been treated by this method.

At our hospital 180 beds are kept at the disposal of our surgical patients, and for this number a bath ward of 6 beds has been provided (Fig. 1).

From the technical point of view the continuous bath is of very simple construction, and it has not been much changed or improved since its introduction. It consists of a zinc or copper tub 2.5 M. long and 1.5 M. wide. The patient rests on a stretcher of strong wire, the head of which is movable and can be adjusted at will. The stretcher can be raised out of the water or lowered deep into it by a handle mounted at the head end of the tub, and the entire structure can easily be taken out of the tub when the bath requires cleaning (Fig. 2). The stretcher is covered by either a blanket or an excelsior-filled mattress, which is in turn covered by a sheet. We do not use rubber mattresses. The tub has a boxlike enclosure of either tiles or metal, and the space between the enclosure and the tub is filled with insulating material in order to prevent the rapid cooling of the water. The tub is further covered with loose boards, which retain the heat and also serve as a table for the patient. The hot and cold water flows into a mixing tank, is brought up to the required temperature and led through a pipe at the foot of the tub, where it enters the bath. The water outlet is also located at this end.

The temperature of the continuous bath is generally kept at about 29 to 30 degrees Celsius. The water temperature must be carefully checked, since, as is the case with paraplegia and other conditions in which loss of sensibility ensues, it becomes only too easy to scald the patient. It is not advisable, therefore, to let either hot or cold water flow into the tub without using the mixing tank.

Disinfectants are not added to the water and, as I shall later show, are in no way necessary.

The water is replenished several times a day, in order to keep the temperature fairly constant and to save the patient from chilling. It is also necessary to empty the tub of pus from suppurating wounds, as well as the patient's excretions. The tub itself is cleaned every forty-eight hours. The air in the bath ward is kept at a constant 27 to 29 C.

Advantages of the Continuous Bath Treatment.—The chief advantages are as follows:

1. The patient floats in the water according to the principle of Archimedes. The pressure on his dorsal parts is diminished and equally distributed. The lower the patient's shoulders rest in the water, the higher his limbs will float.

2. The painful changing of dressings on badly festering wounds and fistulas is avoided, since no dressings are applied during the patient's stay in the continuous bath.

Plaster casts for the treatment of fractures have been applied during bath treatment, but the results were not satisfactory. Cement casts and some other water-resistant materials have not shown any remarkable success. Nylon and water-repellent cast covers are being tried but have not yet emerged from the experimental stage.

3. Interestingly enough, it has been observed that the continuous bath acts as a

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From the Surgical Department of the Kaiser Franz Josef Hospital, Vienna, Prof. Dr. F. Mandl, Chief.

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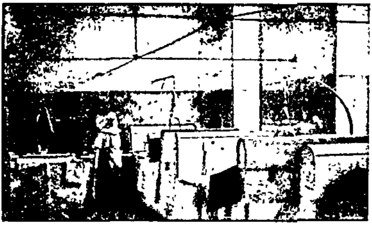

Fig. 1.—Bath ward of 6 beds at the Kaiser Franz Joseph Hospital of Vienna.

disinfectant. Most writers attribute this fact to the oligodynamic action of the metals and/or the hydrodynamic action of the water. The only reply that can be made to the former opinion is that an oligodynamic action of metals does not in fact exist, but that, as a result of the released ions of the heavy metals, a certain *ph* is formed in the area surrounding the metal covering of the tub, which, although it prevents the growth and development of bacteria, does not actually destroy them. I am inclined toward the opinion that the germ concentration in the large area of the tub can only be minimal and that the bacteria therefore show less activity. In addition to this the frequent changing of the water would undoubtedly prevent rapid bacterial growth.

4. The patient's general condition is improved, as well as the vitality and tension of the tissues. These are important factors in the curative action of the continuous bath.

5. Finally, the bath treatment brings the patient enormous relief. The bath provides the opportunity of lessening pain to the irreducible minimum.

Apart from the factors mentioned under Point 4, the curative effect of the continuous bath treatment should also be attributed to the mechanical cleansing of the wound by the water and to the comparative sense of well-being which the patient feels when floating in the water and which psychically supports the healing process.

An ailment that may be brought on by the continuous bath itself is a painful swelling of the soles at the beginning of the treatment. This condition can be improved by painting the affected areas with oleum rusci. Another unpleasant condition caused by the continued immersion is a mycotic type of eczema; this can be successfully treated with sulphur-zinc paste.

Here I should like to add that, in order to protect the patient's body, his skin should be well covered with boric petrolatum before being immersed in the water. No derogatory effect on the cutaneous respiration has ever been observed.

Contraindications. — Contraindications exist and must be strictly observed. Patients with diseases of the heart (myocardiac conditions) or of the lung (pneumonia, pleurisy, open empyema, bronchitis) complicating the disease indicating bath treatment are excluded from the continuous bath.

The theory that the bath treatment takes heavy toll of the patient's entire organism does not completely correspond with the facts. It is left to the decision of the physician in charge of the case to cease treating the patient by continuous bath, or at least to change the treatment to an intermittent one.

Should any of the aforementioned cardiac or pulmonary conditions arise during this treatment, it becomes imperative that the patient be immediately removed from the water. The same measure must be adopted in case of postoperative hemorrhage.

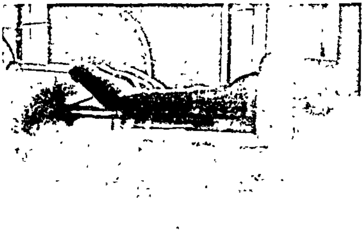

Fig. 2.—Stretcher fitted to tub and employ adjusting the patient's position in [illegible] a

Fig. 3.—Patient undergoing continuous bath treatment.

Sleeping patients are not in any danger of drowning in the bath. It is a fact that as soon as the patient touches the water with his lips or the corners of his mouth, he immediately awakens. Anxiety on this score is therefore entirely unnecessary. In the literature accessible to me there is no record of a case of drowning during continuous bath treatment.

The Wasserbettkater (loss of appetite, depression) mentioned by Demel has been observed by very few of our patients.

Indications.—This treatment should be applied only when all other accessible therapeutic measures have been tried without effect and when the condition of the patient in the dry bed becomes too painful to permit his remaining there.

1. *Nonhealing Decubitus Ulcers* resulting from the immobility of either old persons or paraplegic patients, are a positive indication for continuous bath treatment. The poor general condition of these patients sometimes makes surgical treatment impossible. After a period in the continuous bath, however, the patient's condition generally improves sufficiently to permit any necessary surgical treatment.

Since the patient floats in the water, pressure on the affected areas is relieved. Specially affected areas are protected with gauze rings. In cases of paraplegia it is mainly the outer parts of the knees that are threatened by pressure against the sides of the tub. In addition to being treated as aforedescribed, these patients are supported by a belt drawn across the shoulders and under the arms. In this manner the body is kept from sliding down in the tub. Relief of pressure on the patient's back is achieved by lowering the stretcher head and thus the shoulders of the patient while raising the pelvic area.

My review of the patients treated covers the period from 1947 to 1951. It should be emphasized at the beginning of the statistical report that only the surgical cases are mentioned.

During the aforementioned period we had 14 cases of multiple decubitus ulcers. Dermatologic or surgical therapy was no longer possible, and the condition of the patients, in spite of rubber and water mattresses and other measures, had become unbearably painful. These patients were between 35 and 79 years of age.

Of the 14 patients, 7 died (3 of neurologic diseases, 3 of carcinoma of the rectum and 1 of gangrene). The high mortality rate (50 per cent) is due to the seriousness of the conditions present, and it is my conviction that, had these patients not been treated in the continuous bath, the percentage would have been far greater. In the bath the patients felt immediate relief, and the 7 who recovered showed excellent healing tendencies. Surgical intervention was no longer necessary.

2. *Extended purulent wounds of the soft tissues following incisions* (buttocks, thighs, inflammation of the abdominal wall after peritonitis, incarcerated hernias) also indicate the continuous bath. In the presence of these conditions the treatment relaxes the infiltrated tissues and brings the patient relief from pain. The centrifugal action of the water eases the flow of pus. The application of dressings becomes unnecessary.

It is important to draw attention to the fact that large incisions in the niches and pockets of the infiltrated tissues are a matter of the greatest importance. The water facilitates the flow of pus, but does not prevent pus retention in the wound. On the contrary, it is very easy to over-look this condition, since the patients treated by the continuous bath are generally relieved of most of the pain. For this reason daily wound revisions, a sharp watch on the patient's temperature and leukocyte count is absolutely necessary. A secondary incision should not be avoided. It constitutes no reason for definite removal from continuous bath treatment.

During the period from 1947 to 1951 we had 8 patients with extended soft tissue phlegmons. Of these, 1 died (12.5 per cent).

3. *Roentgen Ulcers*: Ulcers of this type, appearing in the back, make the patient eligible for continuous bath treatment. These ulcers appear after roentgen treatment for the purpose of castration, as a result of roentgen therapy administered after a Wertheim operation for cancer, or similar procedure. The therapeutic action of the continuous bath in these cases is identical with that observed in the cases mentioned under Point 1.

Lately we have had only 1 case of this kind, and, after continuous bath treatment, the ulcers healed.

4. *Fistulas following cholecystectomy, fistulas of the pancreas, stomach, or duodenum, Fecal and Urinary Fistulas* indicate use of the continuous bath treatment, the advantage of which, in these cases, is the continual cleansing of the fistulas. The water leaves the opening as well as the surrounding the fistula and prevents or cures the eczema which often (specially in cases of fecal and perineal fistulas) appears. Urinary fistulas react especially well to this therapy. After a short time the fistula shrinks, and surgical treatment will then completely clear it up.

My associates and I treated 18 patients between 26 and 67 years of age. The mortality rate was 38.4 per cent. Three died of fistulas of the duodenum and 1 of a perineal fistula. Fifteen were discharged, completely cured.

5. *Postoperative rupture of the soft parts of the wounds, caused by infection*, when suppuration of the rupture make the condition difficult to control in the dry bed, was considered an indication in this series, and the patients were transferred into the continuous bath. The ages of these patients were between 18 and 74. The gravity of the conditions involved was responsible for a mortality rate of 30.7 per cent.

6. *Extensive burns* were, for a long time, considered an indication for the continuous bath; in fact, it was thought to be the treatment of choice. Leonardo, however, has expressed the opinion that the continuous bath does not conform to the aseptic principles of such therapy and has therefore become obsolete. The world literature confirms this assertion.

In my opinion the continuous bath treatment has its rightful place even in the age of antibiotics. Its many advantages should not be overlooked. Apart from its therapeutic value, this treatment brings relief from pain.

SUMMARY

The author describes the construction of the continuous bath and lists its advantages, as well as the indications and contraindications for its use. The figures cited in this article were taken from the bath ward provided for the surgical patients treated at the Kaiser Franz Josef Hospital, Vienna.

The author sees the value of the continuous bath in its curative antiseptic and palliative effect, as well as in the improvement of the patient's general condition.

Despite its 90-year existence, the continuous bath has its rightful uses in the era of antibiotics and can be recommended as a valuable therapeutic agent in the treatment of certain conditions.

RESUMEN

El autor describe la construcción del baño contínuo, menciona sus ventajas asi como las indicaciones y contraindicacio para su uso. Las cifras citadas en artículo *fueron tomadas de la sala d* ños para pacientes quirúrgicos t ados el hospital Kaise

El autor usa el valor del bãno contínuo en sus efectos curativos antisépticos y paliativos, así como en el mejoramiento de la condición general del paciente.

A pesar de sus 90 años de existencia, el baño contínuo tiene uso justificado en la era de los antibióticos y puede ser recomendado como un agénte terapeútico valioso en el tratamiento de ciertos padecimientos.

RIASSUNTO

L'Autore descrive il funzionamento del bagno continuato e ne elenca i vantaggi, indicazioni e controindicazioni. I dati si riferiscono al reparto bagni del Kaiser Franz Joseph Hospital di Vienna. L'Autore mette in rilievo l'efficacia di questa terapia a scopo antisettico palliativo e benefico sulle condizioni generali del paziente. Dopo 90 anni dalla sua creazione, il bagno continuato continua ad avere il suo campo d'azione nell'era degli antibiotici e ad essere raccomandato come efficace mezzo nella cura di alcune affezioni.

ZUSAMMENFASSUNG

Der Verfasser beschreibt die Einrichtung des Dauerbades und zählt dessen Vorzüge, Indikationen und Kontraindikationen auf. Die vom Verfasser angegebenen Ziffern stammen aus der im Kaiser-Franz-Joseph-Krankenhaus in Wien für chirurgische Kranke eingerichteten Badestation.

Den Wert des Dauerbades sieht der Verfasser sowohl in der antiseptischen und schmerzlindernden Heilwirkung als auch in seiner günstigen Beeinflussung des Allgemeinbefindes des Kranken.

Trotz des neunzigjährigen Alters der Institution des Dauerbades hat dieses auch im Zeitalter der Antibiotika noch immer einen rechtmässigen Anspruch auf Anwendung und kann als wirksame Heilmassnahme bei gewissen Erkrankungen empfohlen werden.

RÉSUMÉ

L'auteur énumère les avantages et les désavantages avec le procédé du bain continu. Les chiffres donnés sont ceux du service de chirurgie ayant utilisé le bain de l'hôpital Kaiser Franz Joseffà Vienne.

Le bain continu a un effet antiseptique et calmant de même qu'un effet réconfortant pour le patient en général. Malgré ses 90 ans d'existence, a thérapie par le bain continu a sa place dans cette ére d'antibiotiques et peut rendre d'excellents services pour certains cas particuliers.

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To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the **Journal** to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the **Seccion en Espanol**, which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language. Prompt publication can be greatly facilitated if all manuscripts are typed in double or triple space to allow room for editorial corrections. Your cooperation will be deeply appreciated.

Hazards in Diagnosis of Tumors of the Renal Pelvis

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BERNARD E. LeVINE, B.S., M.D.
BOSTON, MASSACHUSETTS

THE object of this report is to present 5 typical case histories, each of which emphasizes an important point in the diagnosis of tumors of the renal pelvis.

Point 1.—Normal urine does not rule out the possibility of a papillomatous tumor of the kidney. Very often an increased fluid intake will dilute the urine to such an extent that few, if any, red blood cells are found in the sediment even with adequate centrifuging. Repeated urinalysis in the following case was deceptive.

I. G., aged 60, was admitted to the hospital with vague abdominal pains which were not localized and not characteristic of any definite illness. The sediment repeatedly gave a negative reaction in a number of urinalyses done daily. The routine diagnostic procedures usually done in obscure cases also gave negative results. Finally, an intravenous pyelogram was done (Fig. 1) and revealed a questionable irregularity in the upper calyx of the right kidney. This was definitely visualized by retrograde pyelographic study. A nephrectomy was done. The pathologic diagnosis was papillary carcinoma of the right renal pelvis.

Comment.—It is well to remember that examination of the urine is only one of many procedures for the diagnosis of renal pathologic change and that a negative result does not necessarily signify a normal organ. It is not unusual to operate on a patient immediately after his first hematuria and remove a renal neoplasm which undoubtedly has been present for many months. The case of I. G. also points out that there is no pathognomonic clinical syndrome. Certain symptoms—hematuria, localized pain, a palpable renal mass and the presence of tissue in the urine—do occur, but any or all of these may be absent. It is for these reasons that a negative Papounicouli stain of the urinary sediment is of questionable value.

Point 2.—Hematuria in a patient with prostatism always presents a diagnostic problem, and even though a potential source for the blood in the urine can be observed in congested prostatic lobes, in areas of hyperemia and edema, or in local varicosities, the upper part of the urinary tract must be investigated to be sure of the primary source of bleeding.

The aged man who has prostatism can also have a renal tumor. The following case illustrates the danger of omitting pyelographic studies prior to prostatectomy, especially in a patient with hematuria.

A. R., aged 61, had had his first attack of painless hematuria eight years, and repeated episodes up to four years prior to admission. He entered another hospital, where cystoscopic procedures but no pyelographic studies were done. Prostatectomy was recommended and performed. The intermittent hematuria persisted, cystoscopic study without pyelographic investigation was performed on two occasions. Shortly before admission the patient was told that he needed another prostatectomy, which he refused. The patient was then seen by my former associate, Dr. Daniel Rosen, who immediately did pyelographic studies (Fig. 2). A roentgen diagnosis of tumor of the renal pelvis was made and a ureteronephrectomy performed. The pathologic diagnosis was papillary carcinoma of the renal pelvis. No implants were observed in the ureter. The patient's convalescence was uneventful.

Comment.—There are many silent sions of the kidney, and tumors can asymptomatically, for a long time. S urologists have maintained that intrave

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Read at the Reunion in Vienna of the International College of Surgeons, May 1952
Submitted for publication July 8, 1952

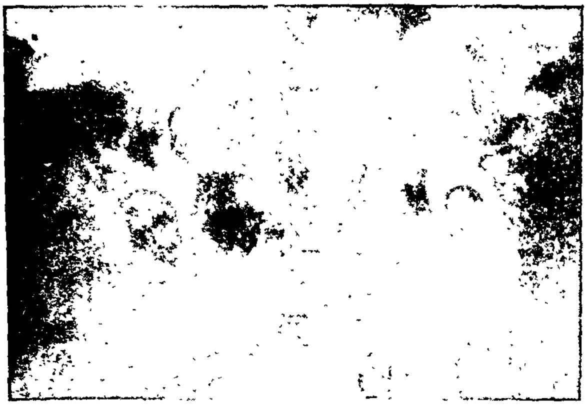

Fig. 1 (Case of J. G.).—Intravenous pyelogram. Filling defect in upper calyx of right kidney.

ous pyelographic studies should be routinely performed before prostatectomy. This produces an economic problem in some cases. Often excretory urograms are not entirely satisfactory, and retrograde pyelographic study is omitted because of the prostatic obstruction that makes ureteral catheterization difficulty. It is undoubtedly a good urologic principle to perform a complete urologic survey of every patient with prostatic disease and hematuria, as well as every patient who has persistent hematuria after prostatectomy.

Point 3.—Vesical, renal, ureteral and even urethral papillomas can coexist. The tumor in one of these organs may produce the presenting symptoms, and the other areas may be easily overlooked.

F. S., aged 60, was admitted to the hospital because of hematuria. Cystoscopic examination revealed papillomas around but not involving the right ureteral orifice. A biopsy was done. The pathologic diagnosis was papilloma of the bladder. The tumors were fulgurated. Three months later a follow-up cystoscopic study revealed blood spurting from the right ureter and no evidence of local recurrence. A retrograde pyelogram (Fig. 3) showed a filling defect of the upper infundibular area of the right renal pelvis and a small defect at the upper and lower end of the right ureter. A right ureteronephrectomy was done. The pathologic diagnosis was papillary carcinoma of the renal pelvis.

A similar situation can occur with vesical papillomas. Finding a potential source of bleeding in the bladder does not rule out pathologic change in the upper part of the urinary tract.

M. A. G., aged 74, had intermittent gross hematuria for three years, during which time tiny papillary carcinomas at the vesical neck, proved by biopsy, were treated by fulguration. Pyelographic studies revealed a tumor of the renal pelvis (Fig. 4). A ureteronephrectomy was done. The pathologic diagnosis was papillary carcinoma of renal pelvis with seedlings in the ureter and the bladder.

Comment.—The tendency of renal papillomas to become implanted in the bladder is well known. There have been many reported cases in which there was no further recurrence of vesical papillomas after adequate ureteronephrectomy. Therefore, a careful investigation of the upper portion of the urinary tract is indicated for patients with recurrent vesical papillomas.

Point 4.—Papillomas of the renal pelvis resemble vesical papillomas in many ways. They originate from transitional cell epithelium, are often multiple, reimplant themselves locally and tend toward malignancy. The renal papilloma is usually considered benign and is composed of villi which have a central stalk of small blood vessels and loose areolar connective tissue surrounded by tiers of cells of the transi-

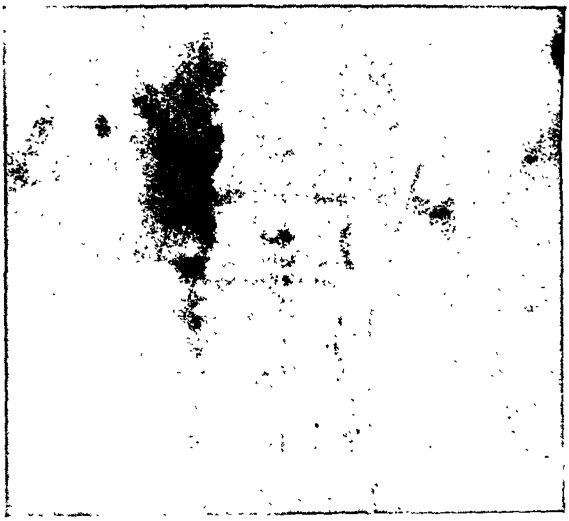

Fig. 2 (Case of A. R.).—Retrograde pyelogram. Obstruction in pelvis just above ureteropelvic juncture.

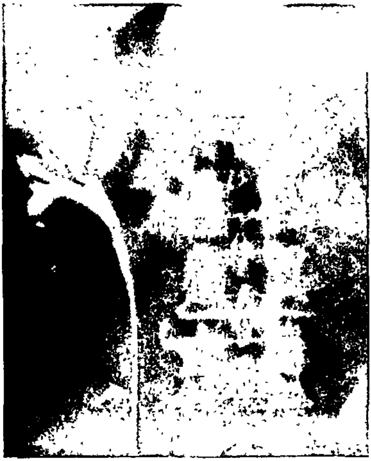

Fig. 3 (Case of F. S.).—Retrograde pyelogram. Dilated upper calyx with large filling defect.

tional type. It is thought that this tumor develops malignant characteristics, invades the submucosa and infiltrates the connective tissue.

How long can a benign papilloma exist in the renal pelvis before malignant degenerative changes occur? In the following case one was present for five years.

M. G., aged 43, on Sept. 13, 1946, noticed hematuria and also pain in the right lower abdominal quadrant which was referred down the penis. An intravenous pyelogram taken on September 14 (Fig. 5 *A*) showed the kidneys to be normal in contour and position. A small round calcified body in the left side, at the level of the spine of the ischium, was noted and was interpreted as a uretheral calculus. The pelves were of the intrarenal type, normal in size and regular in contour. The roentgenologist observed that the calyces on the left side were slightly spastic but made no mention of a filling defect. The patient's symptoms disappeared in twenty-four hours. The urine specimens were strained, but the patient never recovered the calculus. In November 1952 there was an attack of painless hematuria. An intravenous pyelogram was taken. The roentgen diagnosis was tumor of the left renal pelvis. This was confirmed by retrograde pyelographic study (Fig. 5 *B*). On Dec. 15, 1951, a nephrectomy was done. The pathologic diagnosis was benign papilloma of the renal pelvis.

We then went back to the original intravenous pyelogram taken on Sept. 14, 1946, and noted that the same filling defect was present in the pelvis of the left kidney, though probably slightly smaller.

Comment.—It is questionable whether a papilloma remains benign indefinitely. The natural history of papilloma of the renal pelvis is not as well known as that of the primary vesical papilloma. A renal papilloma can grow for many years before malignant degeneration or local implantation occurs.

Point 5.—The association of certain tumors of the renal pelvis with renal calculi and chronic infections has been noted. Oberkircher, Stanblitz, and Blick noted a 26 per cent incidence of associated renal stones in their series of 15 cases of squamous cell carcinoma of the renal pelvis. Other authorities have reported similar incidences. Often the complicating pathologic condition produces the primary clinical signs symptoms. The following case of a renal tumor complicated by hydronephrosis and a renal carbuncle is of interest.

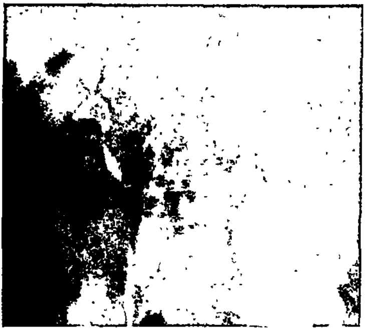

Fig. 4 (Case of M. A. G.).—Retrograde pyelogram. Filling defect in pelvis of right kidney.

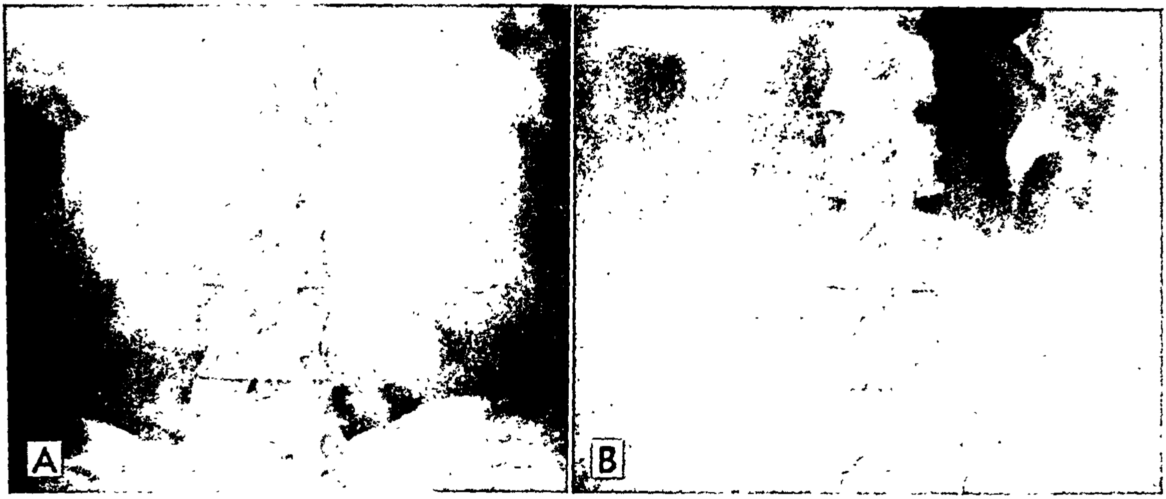

Fig. 5 (Case of M. G.).—*A*, intravenous pyelogram taken in 1946. Filling defect was not observed. *B*, retrograde pyelogram taken in 1951. Filling defect slightly increased in size.

V. D. V., aged 48, entered the hospital complaining of a dull ache in the right upper quadrant of four months' duration and a loss of 15 pounds (6.8 Kg.) in weight. There was a mass the size of a grapefruit situated in the region of the right kidney. It was fixed and tender. The patient had a moderate afternoon elevation of temperature but no significant elevation of the white blood cell count. A retrograde pyelogram was taken (Fig. 6). The roentgen diagnosis was renal neoplasm. A nephrectomy was done. The pathologic diagnosis was papillary carcinoma of the kidney with a gangrenous abscess cavity and calyceal hydronephrosis.

Comment.—Hydronephrosis may complicate intrapelvic tumors, and these produce symptoms when infection occurs. Chamberlin and MacMahon* reported a case of papillary carcinoma of the renal pelvis with extensive infected hydronephrosis and with intermittent signs and symptoms which they explained by the ball-valve action of a pedunculated tumor at the ureteropelvic junction.

SUMMARY

Five cases, each demonstrating a point in the diagnosis of tumors of the renal pelvis, are reported and illustrated. The authors emphasize the tendency of such tumors to exist asymptomatically for long periods, thus escaping detection.

RESUMEN

Se comunican é ilustran 5 casos, cada uno demostrando un detalle en el diagnóstico de los tumores de la pélvis renal. Los autores hacen notar la tendencia de tales tumores de existir asintomáticamente por largos períodos, escapando su detención.

RÉSUMÈ

L'auteur discute en particulier 5 cas de tumeurs des bassinet. Souvent ces lésionns passent longtemps inaperçus.

SUMÁRIO

Cinco casos, cada qual elucidando um ponto no que tange ao daignostico dos tumôres do bacinête, são registrados e documentados nêste trabalho.

Os autôres chamam a atenção para a tendencia de tais tumôres passarem desapercebidos por muito tempo, face a falta de uma sintomatologia evidente.

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*Chamberlin, H. A., and MacMahon, H. E.: Papillary Carcinoma of the Renal Pelvis. New England J. Med. 210: 299-303 (Feb. 8) 1934.

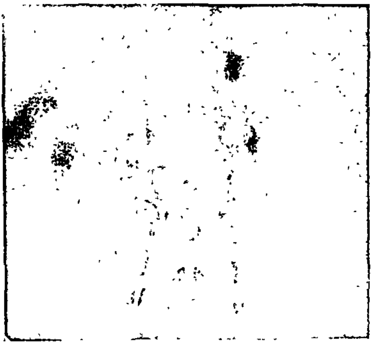

Fig. 6 (Case of V. D. V.).—Retrograde pyelogram. Note bizarre appearance of renal pelvis. Psoas shadows are well delineated.

ZUSAMMENFASSUNG

Es werden fünf Fälle berichtet und illustriert, von denen jeder einen wichtigen *Hinweis auf die Diagnose einer Geschwulst* des Nierenbeckens abgibt. Die Verfasser betonen, dass solche Geschwülste dazu neigen, lange Zeit symptomlos zu bestehen und daher der entdeckung entgehen.

RIASSUNTO

Vengono riferiti ed illustrati 5 casi dimostrativi ai fini della diagnosi dei tumori della pelvi renale. Gli Autori sottolineano il fatto che tali tumori rimangono silenti per lunghi periodi, cosicchè sfuggono facilmente alla diagnosi.

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Benign Leiomyoma of the Esophagus

JACOB RABINOVITCH, M.D., F.I.C.S., D.A.B.S., RUDOLF NISSEN, M.D., F.I.C.S., (Hon.)
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BROOKLYN, NEW YORK

THIS study deals with a group of 17 patients with benign leiomyomatous tumors of the esophagus. In the cases of 2 a correct diagnosis was made clinically and the tumors were removed at operation. In the remaining 5 the tumor was discovered incidentally at autopsy; the latter group of patients presented no clinical evidence indicative of the presence of a tumor.

An analysis of 5,225 autopsies performed at the Jewish Hospital during the past thirty years showed an incidence of 5 such tumors, or approximately 0.09 per cent. Moersch and Harrington[1] reported 32 cases of leiomyoma of the esophagus among 7,459 autopsies performed at the Mayo Clinic, or an incidence of about 0.41 per cent. From a general study of the medical literature bearing on this subject, one is impressed with the relative infrequency of leiomyoma of the esophagus. Only sporadic cases are reported in which removal of these tumors proved successful. Harrington and Moersch[2] operated on 7 patients with benign tumors of the esophagus, 2 of which were leiomyomas. One of the patients required partial removal of the esophagus, and he died of bilateral pneumonia on the fourth postoperative day. The second patient recovered after simple excision of the tumor from the midportion of the esophagus. Brock[3] stated that he was the first surgeon in England to achieve successful removal of a leiomyoma of the esophagus.

Many benign tumors of the esophagus grow intraluminally and give rise to early obstructive symptoms. The intramural tumors, on the other hand, cause obstruction only when they attain considerable size. They grow outwardly, even though expansively, and encroach upon the lumen of the esophagus rather late.

The growth of benign tumors of the esophagus is usually slow, and they may attain considerable size without giving rise to subjective symptoms. The developmental nature of this group of neoplasms, taken in conjunction with the customary age at which the benign varieties first make their presence felt, indicates that many if not most of them remain clinically latent for a number of years. There is no one physical sign or group of signs that can be regarded as pathognomonic of leiomyoma of the esophagus. There may, indeed, be no abnormality detectable upon examination until skiagrams of the esophagus, taken with the aid of fluid barium, are examined. On the other hand, if pressure symptoms are evident, corresponding signs are detected, which may vary from mild dysphagia to severe pain and regurgitation of food.

In the following 2 cases a correct clinical diagnosis was made preoperatively.

REPORT OF CASES

CASE 1.—H. T., a 56-year-old man, was admitted to the Jewish Hospital on Sept. 28, 1948. The chief complaint was pain over the left lower anterior aspect of the chest of three months' duration. During the night he had had a sensation of sour fluid regurgitated into the nose, together with a choked feeling. This was followed by cough and expectoration of sour, yellow sputum. These symptoms were entirely absent during the daytime. When the patient was lying on the right side he had a dull pain in the left lower thoracic area, and when he lay on the left side it caused sour eructation. There was no hemoptysis and no appreciable loss of weight.

Physical examination revealed the patient to be well developed and well nourished. He did not appear acutely ill. The pulse rate was

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68 per minute, the respiratory rate 22, temperature 98.6 F. and the blood pressure in millimeters of mercury 100 systolic and 75 diastolic. The eyes, ears, nose and throat were normal. The lungs were clear to percussion and auscultation. The heart was normal in size and free from adventitious sounds. The abdomen was tender in the region of the gallbladder. There was evidence of gallbladder calculi on roentgen examination.

Fluoroscopic and roentgenographic examination of the chest revealed an area of density in the retrocardiac region. There was a definite delay in the passage of fluid barium through the lower third of the esophagus, the lowermost portion of the esophagus deviated rather sharply toward the left side. The clinical impression was that of a benign growth of the lower end of the esophagus, probably leiomyomatous.

At operation, which was performed on October 1, the left thoracic cavity was entered after resection of the seventh rib. A very bulky tumor mass was observed, encircling almost the entire circumference of the distal end of the esophagus; the tumor also extended into the proximal portion of the cardia of the stomach. An attempt was made to resect the growth away from the esophagus. It was then noted that the tumor involved all the coats of the esophagus except the mucosa, which was much thinned out. At one point the esophageal lumen was inadvertently opened, and it was found necessary to remove the entire tumor-bearing portion of the esophagus, together with the proximal end of the cardia of the stomach. The diaphragm was therefore opened after the left phrenic nerve had been crushed, and the entire distal end of the esophagus and the cardia of the stomach were mobilized. After ligation of the left gastric artery, the left gastroepiploic artery and the vasa brevia, they were divided and the lesser curvature was cleared. The tumor-bearing portion of the esophagus, together with the proximal end of the cardia of stomach, was resected en masse and the stomach closed with a double layer of sutures. In this process the proximal end of the stomach was converted into an elongated tubular structure that could be readily brought into the chest for anastomosis with the esophagus. A new opening was made in the stomach to correspond in size with the lumen of the esophagus, and an esophagogastrostomy was performed as follows: Two layers of interrupted fine silk sutures were used, the first layer being seromuscular, the second one through and through, approximating the edges of the mucosa of the two organs. The union was made without the slightest tension and finally lay some 12 cm. above the diaphragmatic opening, which was closed around the stomach and also sutured the stomach wall. In order to reinsure adequate circulation at the area of anastamosis, a portion of omentum was brought up through the diaphragm to encircle the anastamosis. It was held in place with several sutures to both stomach and esophagus. A rubber catheter was then introduced through a separate stab wound in the ninth interspace, and the wound in the chest was closed. About 500,000 units of penicillin was left in the thoracic cavity.

Postoperative recovery was uneventful, except for collection of serosanguinous fluid in the thoracic cavity after removal of the catheter. The fluid had to be aspirated on several occasions, and after two weeks the patient left the hospital, having fully recovered from the operation. Temporary diarrhea developed which was attributed to section of the vagus nerve.

Pathologic examination of the specimen removed at operation showed it to consist of a nodular mass of pink-grey tissue measuring 12 by 9 by 5.5 cm. The free surface was covered with a thick grey capsule; the inner surface was attached to a portion of the esophageal wall, of which only the mucosa remained intact. On cut section the tumor was seen to consist of numerous nodules of grey, firm tissue thrown into whorls. The nodules were irregular in size and sharply circumscribed, measuring up to 4 cm. in their greatest diameter. These nodules lay directly under the mucosa and were intimately connected with it. It was evident that all the coats of the esophageal wall had been replaced with tumor tissue except the thinned-out mucosa.

Microscopically, the tumor was made up almost entirely of whorls of interlacing bundles of smooth muscle fibers enclosed within a well-formed capsule of fibrous tissue. In some areas the muscle fibers showed evidence of hyaline degeneration. There was no evidence of mitotic cell division, nor did the tumor infiltrate the capsule, the blood vessels or the lymphatics.

Case 2.—This case has been reported in a previous communication[3] and will be briefly summarized here. The patient was a 56-year-old man who complained of esophageal obstruction of short duration. Roentgenographic examination revealed a defect in the midportion of the thoracic part of the esophagus. A diagnosis of benign leiomyoma of the esophagus was made. At operation a large tumor extending from the inferior margin of the aortic arch to within 2 inches (5 cm.) below the level of the bifurcation was discovered and excised. The patient recovered fully from the operation. Histologically the tumor proved to be a benign leiomyoma.

In the remaining 5 cases the tumor was discovered accidentally in the course of routine autopsies performed for unrelated disease. It was clear in each instance that the tumor did not contribute in any way to the cause of death. The respective ages of the patients and the causes of death in these cases are here tabulated:

Age of Patient	*Cause of Death*
71	Carcinoma of colon
57	Landry's paralysis
65	Heart failure and cardiac hypertrophy
52	Cerebral hemorrhage
70	Coronary and arterial sclerosis

There were 3 female and 2 male patients. The tumor in each instance was small, averaging 2 to 3 cm. in diameter. All were firm and well encapsulated, growing intramurally and not encroaching upon the lumen of the esophagus. Microscopic examination of the various tumors showed a similar picture, the interlacing bundles of smooth muscle fibers characteristic of benign leiomyoma.

COMMENT

In spite of the infrequent occurrence of benign leiomyomatous tumor of the esophagus, the neoplasm is of interest not only from the pathologic but from the practical point of view. Although the tumor may occur at any age, it is most often encountered in middle-aged or older persons. The ages of the patients in this series ranged from 56 to 71 years, averaging 61 years. There were 4 male and 3 female patients, showing an approximately equal distribution of the neoplasm btween the two sexes.

The clinical picture presented by this group of cases of leiomyoma of the esophagus merits some detailed description, though in many respects the tumors followed the pattern previously described by other authors. The early signs and symptoms by themselves are not distinctive, since there is no one physical sign or group of signs that can be regarded as pathognomonic. The tumor is usually slow-growing, and it may attain considerable size without giving rise to subjective symptoms. It becomes apparent only with the development of obstruction. The common symptoms are dysphagia, cough, substernal pain and regurgitation of food.

Obviously, a benign growth of the esophagus may remain quiescent for many years. It may enlarge slowly and cause gradual compression of the esophagus. It may, on the other hand, grow rapidly and cause early compression of the organ. Diagnosis is therefore invariably late, as it is dependent on the onset of symptoms, and it is well recognized that the early symptoms of leiomyoma of the esophagus appear rather late in the course of the disease. There is necessarily a latent period between the earliest tumor formation and the patient's awareness of something amiss, and the duration of this period cannot be established at present. Owing to the slow growth of this neoplasm, by the time the disease has produced symptoms of obstruction it has reached a considerable size. Fortunately, malignant transformation in a previously benign leiomyoma of the esophagus is the exception and not the rule, and consequently, delay in surgical treatment does not render the prognosis less favorable, as is the case with malignant growths of the same organ.

In the group treated surgically in the present series the duration of symptoms was not long (approximately three months). The symptoms in each case were typical of compressions of the esophagus, and the tumor found at operation was very large and grew expansively into the wall of the organ. In the autopsy material, on the other hand, the tumors were small, not exceeding a few centimeters in diameter, and their presence was not felt, therefore, during life.

Roentgen examination is a major aid in diagnosis. An intramediastinal shadow in the region of the esophagus, or displacement of the organ to one side, points toward the diagnosis of tumor. So too, interference with the smooth flow of fluid barium through the esophagus is indicative of an obstructive lesion of this organ. The defect produced in the esophagus by the growth yields a characteristic roentgen picture that renders the diagnosis quite certainty. In obstruction of the esophagus, as in obstruction of any other hollow organ, the portion of the tube proximal to the obstruction tends to dilate and the wall to become hypertrophied. This change in the contour of the organ gives rise to a unique roentgen picture and renders diagnosis unmistakable.

The pathologic picture presented at operation is characteristic. The large tumor arising from the wall of the esophagus is so striking that one can scarcely fail to diagnose the condition at operation after having once viewed the lesion. The tumor frequently presents itself as a smooth, relatively immobile, hemispheric, firm swelling arising from the wall of the esophagus. It is usually confined to a segment of the wall, although in 1 of our patients it extended into the proximal portion of the cardia of the stomach.

Leiomyoma originates in the smooth muscle cells of the muscularis of the esophagus and is often well demarcated from the other layers of the esophageal wall. All the tumors in our material, aside from difference in size, presented a unique anatomic picture which was common to the entire group. The tumors were firm and somewhat rubbery. They were homogeneous masses, grey or pink, and arose from the muscular coat of the esophagus. The mucosa underlying the tumor was always well preserved, although in 1 instance it was very much thinned out. The direction of growth was fairly uniform, the tumor for the most part growing outwardly, forming a bulge on the exterior of the organ.

For benign leiomyoma of the esophagus, surgical treatment is not as imperatively indicated as for malignant lesions of the same organ. Of course, the differential diagnosis between a benign and a malignant esophageal lesion at times may prove difficult, and it is well known that delay in treatment of a malignant tumor of the esophagus may prove disastrous to the patient. It is perhaps permissible, in the event of accidental roentgenographic discovery of a symptomless tumor, to withhold radical treatment if any other physical disability or an unfavorable mental reaction contraindicates it, provided that repeated examinations with the aid of skiagrams demonstrate no tendency of the tumor to expand. In all other cases, bearing in mind the limitations of medical treatment and the complications that may result if such tumor is left untreated, one should consider seriously a surgical attempt to obtain a cure and, in most instances, advise it. Complete excision is the ideal to be aimed at when surgical intervention has been decided upon.

It is clear that the location of the tumor, as well as its size, must be taken into account when the operative prospects are being reviewed. The most important factor in the surgical treatment of these tumors is the preservation of an adequate blood supply to the denuded esophageal wall that remains after extirpation of the neoplasm and may lead to necrosis, infection and disruption in the continuity in the wall. It must be noted in this connection that some portions of the esophagus do not possess an adequate collateral circulation, e.g., the midportion is poor in collateral circulation because of the segmental arrangement of the arteries at this point. This fact must be borne in mind when one is faced with a lesion of this portion of the organ, and skilful handling of this difficulty will often insure the success of an enterprise that will be doomed to failure if approached in a slipshod manner.

When the tumor is closely associ[illegible] with the esophageal mucosa, the [illegible] may be unavoidably entered during [illegible] moval of the growth. Closure of the rent in the mucosa may result in narrowing of the lumen. When this occurs in the lower end of the esophagus it is wise to utilize the opening for anastomosis with the stomach in the performance of an esophagogastrostomy; in this way stricture in the esophagus is prevented.

Preservation of the vagus nerves, whenever possible, should be the aim of the surgeon. In low esophageal resections, in which a concurrent complete vagotomy is almost always unwittingly carried out, serious complications involving the digestive tract are frequently bound to follow. Such was the case with our first patient, in whose case the resection had to be carried into the cardiac portion of the stomach, a procedure tantamount to a bilateral vagotomy. As the result of the immediate paralysis of the stomach and small intestine, which only gradually recover their tone and power of movement, certain unpleasant retention symptoms occur. Almost complete gastric paralysis persists for two or three days; peristalsis then gradually returns, though it probably never reaches the same frequency and amplitude as before. In addition to the immediate gastric paralysis, there is nearly always some degree of temporary postoperative dysphagia. This is the result of cardiospasm secondary to trauma inflicted on the esophagus and to interference with its nerve supply. It always passes off spontaneously within a few weeks, but while it exists it increases the tendency to gastric distention already present by aerophagy, which it encourages. These retention phenomena may be accompanied by mild regurgitation and vomiting and followed by transient diarrhea. In the majority of cases these disturbances are relatively mild and are regarded by the patient as of minor importance, but they may be more severe and last for many months. They tend to subside as the stomach and intestine recover their tone and peristalsis.

The choice of operative procedure depends on the location of the tumor and the anatomic involvement of the wall of the esophagus. The transpleural approach offers the best exposure of the esophagus. The prognosis in uncomplicated cases is usually good.

SUMMARY

Seven cases of benign leiomyoma of the esophagus are reviewed and discussed. In 2 patients an accurate clinical diagnosis was made preoperatively and the tumors successfully removed. In the remaining 5 cases the tumors gave rise to no symptoms during life and were discovered accidentally during routine autopsies.

The signs and symptoms of these tumors of the esophagus are not distinctive until compression of the organ occurs. Skiagrams of the esophagus, taken with the aid of fluid barium, help considerably in establishing a diagnosis.

RESUMEN

Se revisan y discuten siete casos de leiomioma benigno del esófago. En 2 pacientes se hizo el diagnóstico clínico exacto preoperativamente y los tumores fueron extirpados con éxito. En los 5 casos restantes los tumores no produjeron síntomas durante la vida y fueron descubiertos durante autopsias de rutina.

Los sígnos y síntomas de estos tumores esofágicos no son definidos hasta que se produce compresión del órgano. La radiología esofágica tomada con la ayuda de bario líquido ayuda considerablemente al establecimiento del diagnóstico.

ZUSAMMENFASSUNG

Sieben Fälle von gutartigem Leiomyom der Speiseröhre werden untersucht und erörtert. Bei zwei Kranken wurde eine richtige klinische Diagnose vor der Operation gestellt und die Geschwülste erfolgreich entfernt. In den übrigen fünf Fällen verursachten die Tumoren bei Lebzeiten keinerlei Symptome, und ihre Entdeckung erfolgte als Zufallsbefund gelegentich der routinemässigen Obduktion.

Diese Geschwülste der Speiseröhre rufen keinerlei eigentümliche Krankheitszeichen oder Beschwerden hervor, bis es zu einer Kompression des Oesophagus kommt. Die Röntgenuntersuchung der Speiseröhre mit flüssiger Bariumsuspension stellt ein wesentliches diagnostisches Hilfsmittel dar.

RÉSUMÈ

L'auteur rapporte en discussion 7 cas de léiomyome bénin de l'oesophage. Deux cas furent diagnostiqués avant l'opération qui a bien réussi. Les 5 autres cas furent découverts à la nécropsie. Il n'existe aucun trouble avant ceux causés par la compression tumorale. Le diagnostic se fait par la radiologie.

SUMARIO

São registrados sete casos de leiomiôma beigno do esôfago, em os quais um perfeito diagnostico pre-operatório seguido de cura cirúrgica foi feito em dois doentes, e os cinco restantes observados no curso de autopsias de rotina, uma vez que não haviam apresentado quaisquer sintômas que fizessem os mesmos, durante a vida, se queixarem.

Os sinais e sintômas dêsses tumôres apenas podem sêr distinguidos quando já acarretam compressão do esôfago. São discutidos os mêios auxiliares para o diagnostico.

RIASSUNTO

Vengono esposti e descritti 7 casi di leiomioma benigno dell'esofago. Due volte fu fatta una precisa diagnosi clinica preoperatoria e i tumori vennero successivamente asportati. Negli altri 5 casi i tumori furono clinicamente silenti durante la vita sicchè costituirono reperti accidentali in caso di autopsia. La sintomatologia di tali tumori dell'esofago non è caratteristica fino a quando non si istituisce una sindrome da ostacolo. Lo studio radiologico dell'esofago a mezzo di pasto opaco aiuta considerevolmente nel precisare la diagnosi.

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Entrance of the Common Bile Duct into the Apex of a Duodenal Diverticulum

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THE purpose of this paper is to report an unusual case in which the common bile duct entered into the apex of a diverticulum in the second portion of the duodenum.

It is well established that duodenal diverticula are not an uncommon roentgenologic entity. Approximately 65 per cent of the diverticula occur in the second portion of the duodenum, coming off the concave surface. Diverticula located in the immediate vicinity of the ampulla of Vater are designated as perivaterian. The direct entrance of the common bile duct into a duodenal diverticulum is, however, a rare clinical entity.

Collet, Tirman and Caylor[1] reviewed the literature and found only 5 such cases reported prior to 1949, in which the condition was discovered at necropsy. These authors reported a case of their own, in which it was discovered by cholangiogram studies subsequent to cholecystectomy and choledochostomy with insertion of a T tube into the common duct. Recently Greenler and Curtis[2] reported a case in which the common duct entered into a duodenal diverticulum. This was discovered during a secondary exploration of the duodenum. Blegen, Swanberg and Cox[3] reported a case in which the entrance of the common bile duct into a duodenal diverticulum was associated with a duodenal ulcer. This was the first case reported in which the entrance of the common bile duct into a duodenal diverticulum was recognized at initial celiotomy and successfully repaired. To the best of our knowledge, the case here reported is the second.

REPORT OF CASE

J. W., a white man aged 67, complained chiefly of pain in the right upper quadrant of the abdomen, radiating to the epigastrium. The pain was intermittent and colicky and was associated with nausea, vomiting, chills and fever. The patient had noticed the onset of these symptoms about two and one-half months prior to admission. He attended the gastroenterology clinic, and a gastrointestinal roentgen series revealed a diverticulum of the second portion of the duodenum (Fig. 1) which did not demonstrate retention of barium on the six-hour film. A gallbladder series showed poor concentration of the dye, with sluggish expulsion. Duodenal drainage studies revealed the presence of cholesterol crystals. Dietary and antispasmodic therapy was given, and the patient seemingly improved up to one month prior to admission, at which time the symptoms recurred and steadily increased in severity. He had lost 25 pounds (11.3 Kg.) in weight since the onset of symptoms. The past history was noncontributory.

Physical examination revealed the patient to be poorly developed and in moderate distress. The sclera appeared mildly icteric. There were marked dorsolumbar scoliosis and lordosis. There was tenderness in the right upper abdominal quadrant. A firm, round, tender mass was palpated below the right costal margin. This mass could not be displaced by palpation. During the initial physical examination a chill developed, followed by an elevation in temperature to 103 F.

The red blood cell count was 4,200,000 and the white blood cell count 12,050 per cubic millimeter, with a shift to the left in the hem-

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†Deceased.

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ogram. The icteric index was 21.8 units. The Van der Bergh test showed an immediate direct reaction. The prothrombin time was fourteen seconds (control was sixteen seconds). The value for cholesterol was 275 mg., and that for cholesterol esters 119 mg., per hundred cubic centimeters. The cephalin flocculation test gave a negative result after forty-eight hours. The value for alkaline phosphotase was 12.75 King and Armstrong units. The value for serum protein was 8.85 Gm. per hundred cubic centimeters. The albumin-globulin ratio was 1:1. The values for blood sugar and urea nitrogen were respectively 90 mg. and 14.8 mg. per hundred cubic centimeters. A culture of the blood was sterile after two days' incubation. In milliequivalents, the values for serum chlorides, serum potassium and serum sodium were respectively 80.2, 4.2 and 141.4.

After correction of dehydration and institution of antibiotic therapy, operation was performed on Sept. 6, 1951 with the diagnosis of extrahepatic biliary obstruction probably due to a calculus of the common duct or a pancreatic tumor.

The abdomen was entered through a right subcostal incision with the patient under cyclopropane, oxygen and ether anesthesia. Exploration of the abdomen was negative except as presently described. The gallbladder was markedly dilated and thin walled as were the cystic duct and the common bile duct. A firm, round mass was palpated in the region of the ampulla, giving the impression of a tumor mass. The peritoneum of the lateral border of the duodenum was severed and the duodenum reflected medially. Tedious dissection revealed a mass in the terminal portion of the common duct. The common duct in turn entered into the apex of a duodenal diverticulum (Fig. 2) in the second portion of the duodenum. An incision was made in the terminal segment of the common duct, 2 cm. from the apex of the diverticulum, and the stone was extracted. Through this opening the ampulla was probed and its entrance into the apex of the diverticulum verified. The common duct was then opened in its supraduodenal portion, and a T tube was inserted, with a long arm extending through the ampulla, diverticulum and well into the duodenum. The incision in the terminal segment of the common duct was closed with interrupted silk sutures, and the diverticulum was inverted with the long arm of the T tube in the duodenum. The patient made an uneventful recovery. The T tube was removed six weeks after the operation, and a subsequent gastrointestinal roentgen series showed no evidence of a duodenal diverticu-

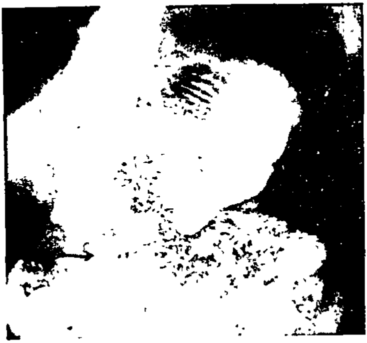

Fig. 1.—Gastrointestinal roentgen series revealing a diverticulum of the second portion of the duodenum. The diverticulum did not show retention of barium on the six-hour film.

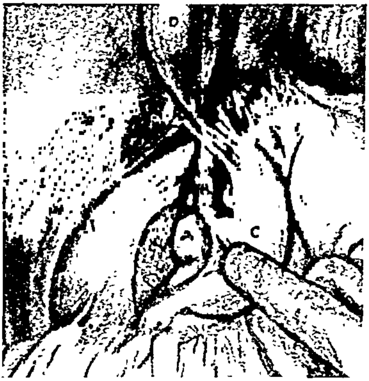

Fig. 2.—The above is a photograph taken of a drawing (by Mrs. Hassan Abtahi) of the exposure at operation. *A*, duodenal diverticulum coming off the second portion of the duodenum. *B*, terminal portion of the common duct entering into the apex of the diverticulum, revealing dilatation due to a calculus within its lumen. *C*, the duodenum reflected medially. *D*, the dilated gall bladder.

lum. The patient was seen six months after the operation and was clinically well, with no recurrence of signs or symptoms.

SUMMARY

A case is reported in which the common bile duct entered into the apex of a duodenal diverticulum, with an associated obstruction of the common duct due to a calculus.

To the authors' knowledge this is the second such case reported in the literature in which the condition was recognized at celiotomy and successfully treated by surgical means.

Inversion repaired the diverticulum, with no subsequent obstruction to the common bile duct or the pancreatic ducts.

SUMARIO

E apresentado um caso de obstrução ditiasica do coledoco, no qual o conduto biliar desembocava no vertice de um diverticulo duodenal.

Segundo pensam os autôres, é êsse o segundo caso registrado na literatura, no qual a lesão foi descoberta no curse de laparotomia, sendo tratada com sucesso pela cirurgia.

ZUSAMMENFASSUNG

Es wird über einen Fall berichtet, in dem der Choledochus in die Spitze eines Duodenaldivertikels einmündete und gleichzeitig durch einen Gallenstein verstopft war.

Soweit den Verfassern bekannt ist, handelt es sich hier um den zweiten in der Literatur veröffentlichten Fall, in dem die Erkrankung bei der Laparatomie erkannt und die chirurgische Behandlung erfolgreich war.

Das Divertikel wurde durch Einstülpung beseitigt, ohne dass es später zu einem Verschluss des Choledochus oder des Bauchspeicheldrüsenganges kam.

RIASSUNTO

Viene riferito un caso in cui il coledoco faceva capo alla sommità di un diverticolo duodenale, ed era ostruito da un calcolo. A quanto n e può dire l'autore questo è il secondo caso riferito nella Letteratura in cui la suddetta condizione anatomica costituì un reperto operatorio e venne trattata con successo chirurgicamente. Il diverticolo fu affondato senza che ne seguisse l'occlusione del coledoco, e dei dotti pancreatici.

RÉSUMÈ

Les auteurs rapportent un cas de calcul obstruant le cholédoque qui s'abouchait dan un diverticule du duodénum. Ce cas serait le second rapporté dans la littérature. Le traitement fut chirurgical, une inversion du diverticule sans complication aux canaux pancréatiques.

RESUMEN

Se comunica un caso en el cual el conducto colédoco desemboca en el apex de un divertículo duodenal, con una obstrucción del colédoco debida a un cálculo.

Segun el autor, este es el segundo caso que se comunica a la literatura en la cual se reconoció esta condición en la celiotomía y se trató con exito por medios quirúrgicos.

Inversión, reparación del divertículo, sin obstrucción subsecuente del conducto común de los conductos pancreáticos.

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Surgical Treatment of Skeletal Metastases

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THE problem of skeletal metastases so frequently confronts the orthopedist that it would be well to review the current concepts of diagnosis and treatment in the light of more recent advances, particularly in the field of surgical fixation of pathologic fractures. Secondary skeletal malignant lesions are decidedly more frequent than primary malignant bone tumors. Of these secondary malignancies of the osseous system, the most common are carcinoma metastases by the lymphatic or blood stream. There may occasionally be direct extensions of a neighboring soft tissue malignant tumor into bone. In addition, the lymphomas or leukemias may rarely be present with primarily osseous manifestations.

There is a variable incidence of skeletal metastases, depending upon the type of neoplasm. However, autopsy studies have shown that there appears to be no type of carcinoma incapable of metastasizing to bone. Coley has used the term "ossophile" to describe carcinomas which have a tendency to metastasize to bone. These include particularly carcinomas of the breast prostate, thyroid and kidney. It has also been shown recently that many so-called Ewing tumors or endotheliomas of bone are really metastatic small cell carcinomas of the lungs, the so-called "oat cell" type.[1] However, a true Ewing tumor of bone, which is highly malignant, is also encountered.

Metastases by retrograde lymphatic extension favors bone nearest the primary growth. Thus, mammary carcinoma favors the ribs, the thoracic portion of the spine, and the skull. In prostatic cancer, it is the sacrum, the lumbar portion of the spine and the pelvis which are most commonly involved. Hematogenous metastatic deposits may occur in any of the bones. They are, however, only rarely seen distal to the knees or elbows.

There are two principal forms of bone metastases, osteolytic and osteoblastic. The osteoblastic lesion arises as a bone formative reaction to the stimulus of the tumor depositing in that area. It is not a metaplastic manifestation of the tumor itself. A similar bone formative reaction is observed in sensitive osteolytic lesions following radiotherapy.

Most osteoblastic lesions result from carcinoma of the prostate. Occasionally a breast lesion may present a similar picture.

In an osteolytic lesion the bone tissue in the metastatic mass is destroyed, and occasionally the tumor mass may stimulate a peripheral osteoblastic reaction, in which instance there will be osteosclerosis or periosteal new bone formation surrounding the lytic lesion.

Blood Chemical Picture. — The blood chemical changes associated with carcinoma metastatic to the skeletal system result from either the destruction or the repair, or both, of the involved osseous tissue. Osteoblastic lesions are accompanied by a local and often a general serum alkaline phosphatase elevation. Purely osteolytic lesions produce little or no rise in the alkaline phosphatase.

The greater the degree of bone destruction, the higher may be the serum calcium and phosphorus levels. Probably this elevation results from inability of the kidney to excrete the end products of bone lysis rapidly enough. Furthermore, this calcium may be protein-bound and therefore not as easily excreted. A serum calcium co tent of 13 mg. per hundred cubic ce meters of blood serum or above may c.

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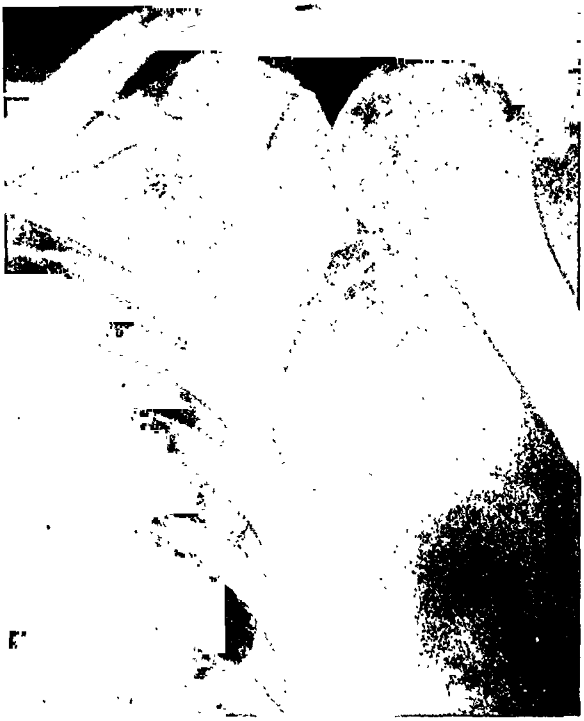

Fig. 1.—Pathologic fracture of humerus secondary to metastatic carcinoma, showing cystic changes associated with the fracture.

serious clinical symptoms—nausea, lassitude and even mental confusion. However this calcium rise is more apt to be of ionizable calcium resulting from rapid release of calcium from the bone or a disuse factor, rather than from calcium released by tissue destruction in a protein (globulin)-bound form.

Marked osteoblastic lesions may result in severe osteoid "hunger" for calcium and phosphorus, so that the blood levels and the excretion of these elements will not vary appreciably from the normal. Yet, the alkaline phosphatase content may become considerably elevated. In these lesions, evidences of hypercalcemic toxicity are therefore not seen. It is actually possible for the bone attraction for calcium to be so marked as to cause tetany.

Lesions of a degree intermediate between those which are purely osteolytic and those which are purely osteoblastic may present intermediate blood chemical pictures. In this instance, small elevations in alkaline phosphatase, calcium and phosphorus will be observed.

The value for serum acid phosphatase is now recognized as a most important sign of metastatic cancer of the prostate.

Osseous pain or even a pathologic fracture may be the first clinical evidence of a neoplasm. Secondary deposits may be noted at any time, at the first discovery of the primary tumor and even many years after it has been removed.

The classic roentgenographic pictures of the various metastatic skeletal lesions will not be reviewed here. There are, however, certain important observations that should be made. It has been shown many times that a normal roentgenogram does not exclude small metastatic foci in the marrow spaces. This is true particularly of the spine.[2] The earliest evidence of a small metastatic lesion is an alternation of the trabecular pattern. Progressive irregularity and destruction of the lamellar bone occur. Fnally, confluent irregular areas indicate progressive invasion.

Spontaneous fracture of a long bone is indicative of a pathologic fracture. A smooth, rounded margin with evidence of bone destruction on the roentgenogram is commonly found in metastatic lesions (Fig. 1). Sudden or persistent pain in the back with or without radiation in girdle fashion makes the spine suspect.

In cases of vertebral collapse, differentiation between myeloma and osteolytic carcinomatosis is often difficult (Figs. 2*A* and 7). Fortunately, the differentiation is reasonably certain in that multiple myeloma will show at least one of the following signs: Bence Jones proteinuria, plasma cells in peripheral blood or sternal puncture fluid and elevation of the total serum protein level with reverse of the albumin-globulin ratio.

Surgical Indications and Technics.—Osseous metastases accompanied by impending or actual pathologic fractures are a difficult problem. Although the course of terminal carcinoma is always a sad one, the pathologic fracture brings shock and profound pain. Yet support of the fracture is imperative. The usual methods involving the use of plaster of paris supports, splints and traction are often insufficient and have, moreover, confined patients to bed when the lesion involves the lower extremities. This results in further loss of bone substance from disuse, increased likelihood of renal disturbances and the additional problem of bedsores. Obviously another method, such as internal fixation of the fracture, whenever possible, is desirable.

Intramedullary fixation is, in our opinion, the treatment of choice for actual or impending pathologic fractures of the long bones. The clover-leaf nail of Küntscher is used in the femur. In other long bones, especially the humerus, the three-point fixation technic of Rush is perferred.

When actual pathologic fracture has occurred, the open method of intramedullary nailing is the procedure of choice. The nail is passed in a retrograde manner. In the femur, the lateral or posterolateral approach may be used. A biopsy specimen of the metastatic lesion may be taken at the time of surgical intervention. Additional bone graft material, either autogenous or obtained from a bone bank, can be placed about the fracture.

Examination of the extremely friable tissues in these osteolytic lesions at the time of operation makes it plain why earlier attempts at plate fixation have usually failed. The invaded medulary and cortical osseous tissues are too soft to permit adequate fixation of the screws holding the plate. It is for this reason that nails or plates for pathologic hip fractures may not routinely hold. However, in selected cases they may hold very well.

One word should be said about the preoperative preparation of a patient with advanced osteolytic carcinomatosis. The accompanying negative calcium balance must be remedied preoperatively and testosterone continued postoperatively.

In the event that the kidneys are performing normally, the calcium and phosphorus intake must be increased. This can be done by diet and also by the use of intravenous calcium gluconate through a continuous drip.

Testosterone may be most helpful, for it preserves protein even at the expense of carbohydrates and fats, if necessary. Furthermore, it favors bone formation. When kidney function is maintained, it may be given with relative impunity, especially if early ambulation is possible. Doses of testosterone may be 100 mg. daily for two weeks, then thrice weekly for two weeks; then 50 mg. two to three times weekly for an indefinite time thereafter, or until a total of 3 to 5 Gm. has been given.

Estrogens may be administered even to the male patient to increase bone production. A simple form is Premarin, 1.25 mg. one to three times daily. In women, even women of advanced age, some vaginal discharge may occur, but, of course, they should be informed of this possibility.

Some metastatic lesions, especially from the breast, are dramatically affected by hormones. We have observed numerous fractures from metastatic breast tumors which have healed beautifully with intramedullary fixation and either testosterone or estrogen therapy.

So too, may some fractures due to prostatic metastatic tumors be expected to heal with estrogen therapy or after an orchiectomy.

Huggins' dramatic work in adrenalectomy is one of the great instances of provocative thinking in the field of malignant diseases.

If one speculates on the effect of the pituitary growth hormone on cartilage proliferation, the thought arises that malignant disease of the cartilage cells may be slowed by hypophysectomy, as indeed may any tumor with severely active cellular activity.

Up to the time of writing our patients have been in the advanced stage. Some of these metastatic fractures have completely healed; in other cases only partial repair has been accomplished before death ensued. We have nailed fractures of the su gical neck and have fixed intertrochant fractures.

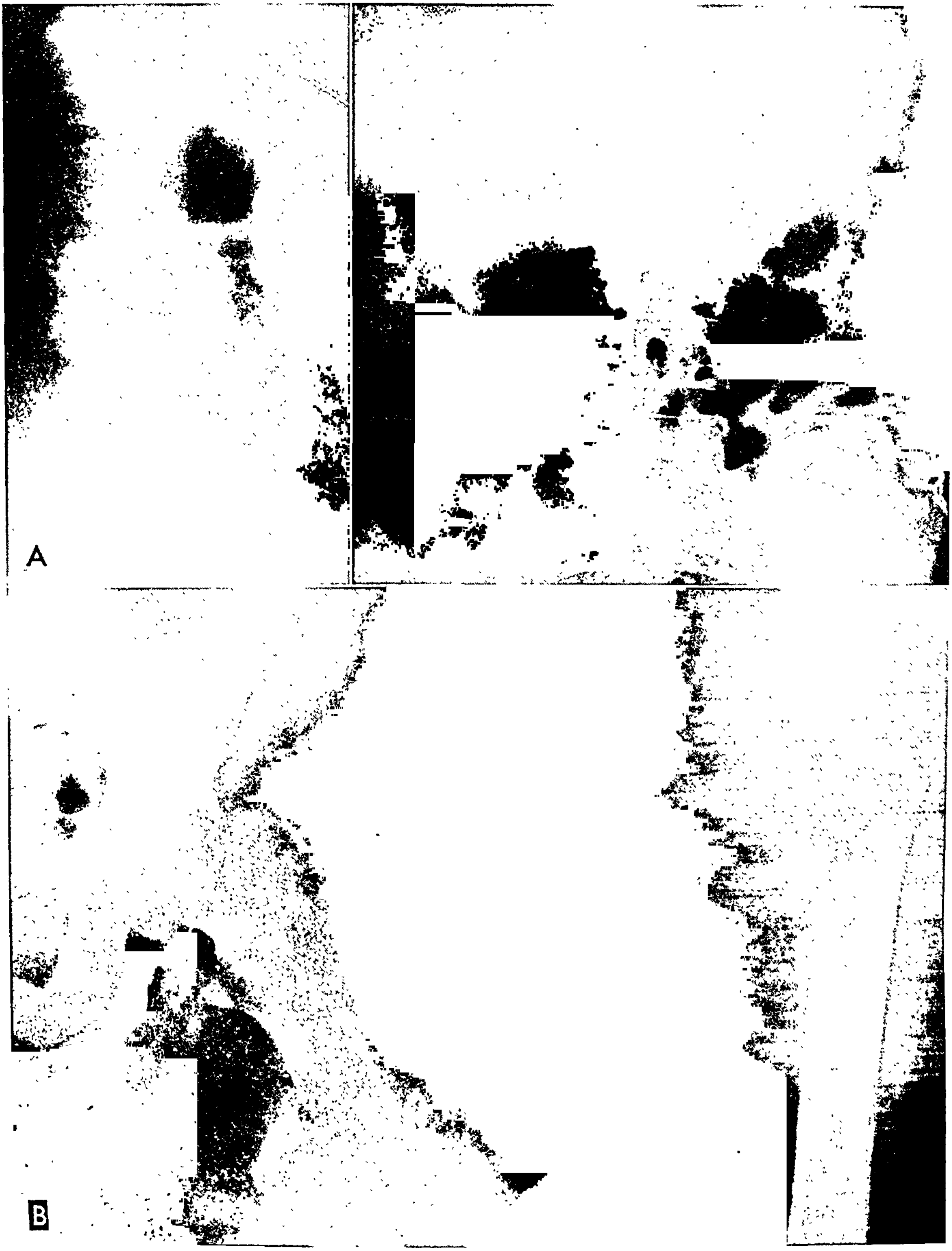

Fig. 2.—*A*, pathologic compression fracture of the first lumbar vertebra secondary to metastatic carcinoma of the breast. *B*, pathologic fracture of femur, secondary to metastatic carcinoma, probably of renal origin.

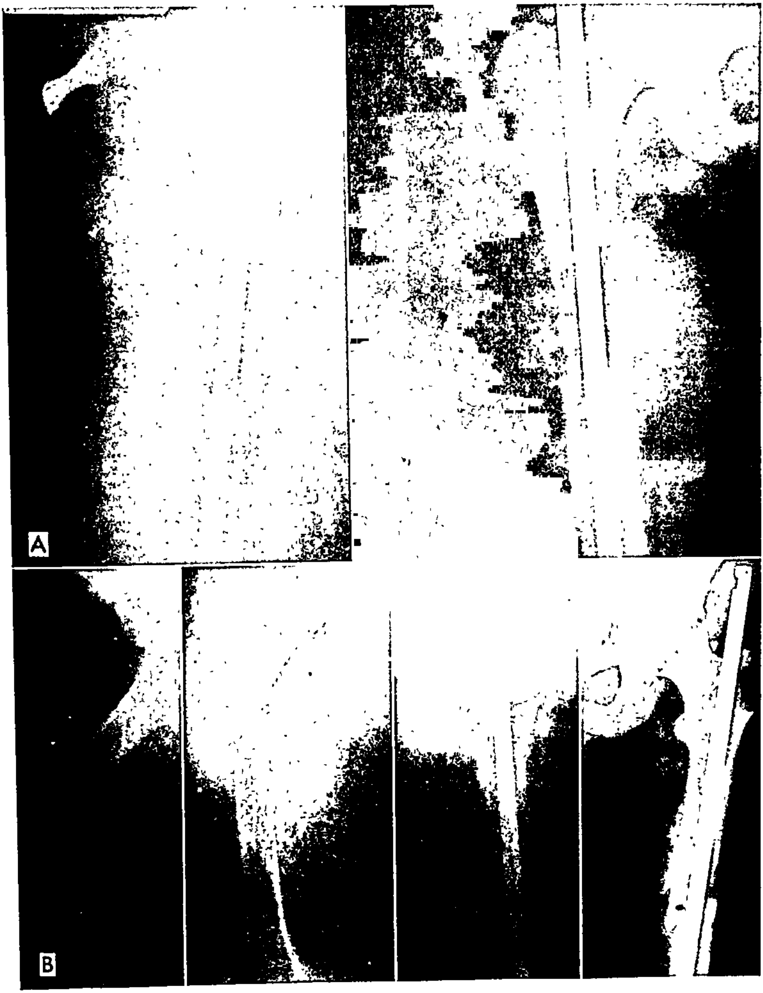

Fig. 3.—*A*, pathologic femoral fracture following intramedullary Küntscher nail fixation. *B*, metastatic mammary carcinoma with pathologic fracture of the upper portion of the femur, before and after Küntscher nail fixation

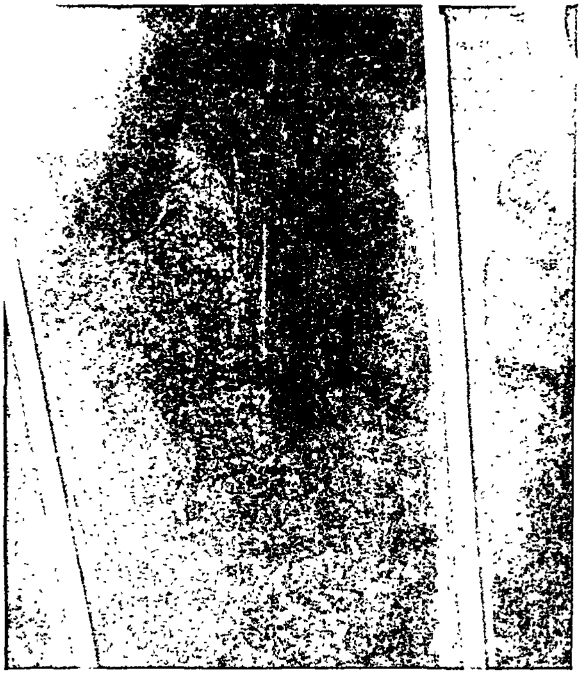

Fig. 4.—Metastatic femoral fracture, five months after intramedullary fixation, showing partial healing.

Altman has reported healing of pathologic fractures of the femur following intramedullary nailing.[3] Fitts has reported healing of a metastatic lesion causing fracture after fixation with a nail plate.[4]

We have encountered no case in which *there was sufficient evidence of impending* fracture to require fixation. If such a case were observed, fixation would be used. Retrograde nailing would not be necessary here. Simple "blind" nailing with roentgenographic control would be the procedure of choice.

We are reporting a rare case (Case 4) of spine fusion for malignant change in the vertebrae. True, the condition in this case simulated at the start a clear-cut clinical and roentgen picture of tuberculous spondylitis. For this reason, and since no lymph gland enlargement or other evidence of malignant disease could be detected, the fusion operation was performed. The lymphogenous spread of the Hodgkin's disease did not occur until later. Its importance to us now is based on the demonstration it affords that occasionally a malignant focus in the vertebrae may be solitary and that stabilization by a spine fusion operation may give the patient comfort, regardless of the ultimate prognosis of the underlying disease.

REPORT OF CASES

CASE 1.—E. S., a 59-year-old white woman, was admitted to the Stein Orthopedic Service of the Philadelphia General Hospital on June 7, 1951. She had been complaining of pain in the left arm and right hip area for the previous eight months. Analgesic medication by the family physician had been given, without relief. Two days before admission she had tripped in her home and had sustained a pathologic fracture of the upper third of the right femur (Fig. 2 *B*). In addition, the roentgenograms revealed a metastatic lesion of the surgical neck of the left humerus (Fig. 1).

On June 13 an open reduction and intramedullary fixation, with use of a 9 mm. by 38 cm. Küntscher nail, was performed (Fig. 3 *A*).

Flat plate examination of the abdomen revealed an enlarged left kidney. The intravenous urogram revealed no function of the left kidney. Retrograde urographic studies were performed.

After the operation the patient was ambulatory with the assistance of crutches and with some weight bearing on the right femur within several weeks. On August 2 a foot-drop was noted on the right side, with diminished distribution over the fifth lumbar and first sacral dermatomes. Between July 12 and July 19, roentgen therapy, to a total of 1,836 r each to the right femur and the left shoulder, was given.

The patient did well for three months after the Küntscher nailing. By September her condition had begun to deteriorate rapidly, and she again became bedridden. At the request of the family she was discharged to her own home on October 4, and died there one week later. Permission for autopsy was not obtained. However, the pathologic report on the bone biopsy of June 13 was, "areas containing groups of epithelial cells with a clear cytoplasm, suggestive of renal origin."

CASE 2.—M. L., a 64-year-old white woman, was first admitted to the Stein Orthopedic Service of the Philadelphia General Hospital on Nov. 1, 1951. The patient had fallen one day before admission and had been unable to rise. There was severe pain in the upper part of the left thigh. Clinical and roentgen examination disclosed a pathologic fracture of the upper third of the left femur (Fig. 3 *B*).

The past history revealed that a right radical mastectomy had been performed on March 17, 1944, at another hospital. This was more than seven years before the occurrence of the pathologic fracture. The first metastatic symptoms occurred in April 1951, with pain in the lower part of the back. Roentgen films taken in May at the institution where the mastectomy had originally been performed revealed osteolytic metastatic lesions involving the seventh to the twelfth thoracic and the fifth lumbar vertebrae, with pahologic compression fracture of the first lumbar vertebra (Fig. 2 *A*). In August, metastatic deposits in the lungs and ribs were noted. Since July the patient had been given testosterone (100 mg. three times weekly), with some relief of the pain in her back. No local roentgen therapy had been given prior to her admission to the Philadelphia General Hospital.

On November 7 an open reduction with an 11 mm. × 42 cm. Küntscher nail was performed on the left femur (Fig. 3 *B*). Three

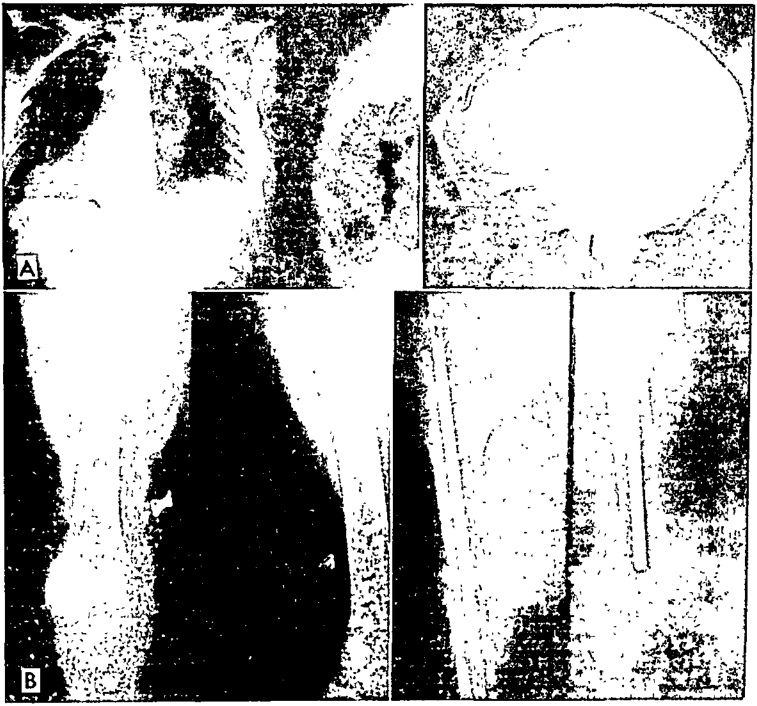

Fig. 5.—*A*, multiple myeloma with paraplegia, showing compression fracture of ninth thoracic vert bra and skull lesions. *B*, Pathologic fracture of femur in case of multiple myeloma, before and af fixation with Küntscher nail and Parham bands.

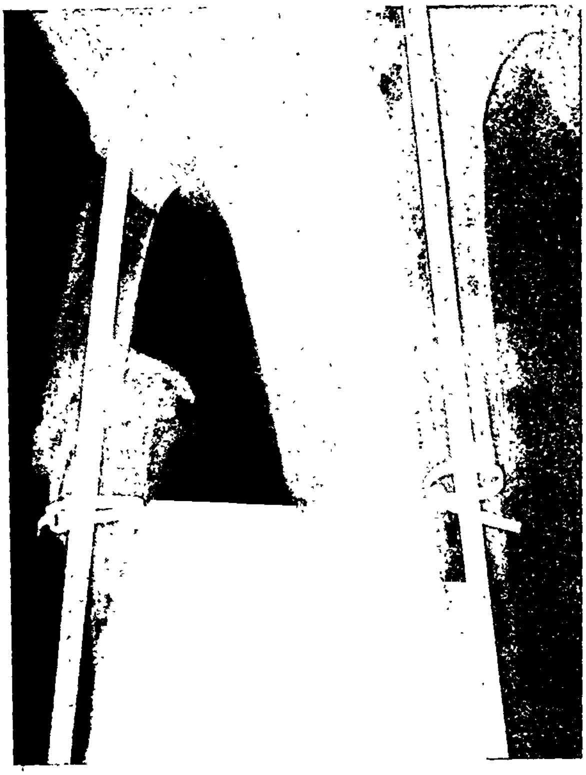

Fig. 6.—Pathologic fracture due to multiple myeloma in femur, four months after intramedullary fixation with a Küntscher nail supplemented by a Parham band. Excellent callus formation.

units of blood were given during the operation. Postoperatively, high voltage roentgen therapy was given to the thoracic-lumbar portion of the spine and the left femur. Testosterone was continued.

It is of interest that this wide osteolytic carcinomatosis, blood chemical valves on November 5 were normal: calcium, 10.5; phosphorus, 2.8, and alkaline phosphatase, 2.5.

Postoperatively the patient did extremely well and was permitted to become ambulatory on crutches. The lower extremities were noted to be equal in length on December 12, the date of discharge from the hospital.

The patient did well until May 28, 1952, when it was necessary to readmit her to the Medical Service of the Philadelphia General Hospital for severe shortness of breath accompanied by pulmonary edema. She failed to respond to diuretics, oxygen and digitalization. Small thoracenteses for fluid were done. Roentgenograms revealed partial healing of the left femoral fracture (Fig. 4). The patient went rapidly downhill and died on May 31.

Autopsy was performed and revealed metastatic mammary carcinoma with involvement of the supraclavicular and mediastinal lymph nodes and peritoneum, the liver, the vertebral column and the left femur.

CASE 3.—L. D., a 65-year-old Negro woman, was admitted to the Neurology Service of the Philadelphia General Hospital on Dec. 27, 1949. Her chief complaint was progressive inability to walk, which had increased rapidly over the two or three weeks preceding her admission. In addition, it was learned that there had been several episodes of abdominal pain since May 1949.

Examination disclosed that the patient was suffering from spastic paraplegia. A sensory level was present at the tenth thoracic segment.

Lumbar puncture performed on December 28 revealed an initial spinal fluid pressure of 100 mm. There was no rise of the pressure on the Queckenstedt test.

On December 20 a myelogram revealed a block at the ninth thoracic vertebra, with a compression fracture of this vertebral body (Fig. 5 *A*).

Laboratory studies of significance were as follows: The total protein content of the spinal fluid was 140 mg. The sedimentation rate was 65. A test for total protein with the albumin-globulin ratio was not done until later in the patient's hospital stay, but the results were significant. The value for total proteins was 7.5 and those for albumin and globulin 3 and 4.5 respectively.

Exploratory laminectomy was considered soon after admission, but had to be deferred because of the patient's reluctance about surgery.

Finally, on March 4, 1950, laminectomy in the region of the ninth thoracic vertebra was done and revealed a large extradural tumor. Pathologic study of a biopsy specimen from this mass revealed it to be a plasmocytoma.

Subsequent sterile marrow puncture and iliac biopsy also revealed plasma cells, and the diagnosis of multiple myeloma was confirmed.

After decompression, the signs of spastic paraplegia improved only slightly. Adjuvant high voltage roentgen therapy, centering over the ninth thoracic vertebra, was given. After this treatment the patient's legs regained power to the point of enabling her to take a few steps.

Her progress, however, was not such as to discharge from the hospital could be considered. There was still pain the region of the abdomen. There was some pain in the back.

Limb power was only minimally improved. Patient was placed on a chronic ward in early 1951. On October 19, while the patient was being moved in bed, she sustained a pathologic fracture of the upper third of the left femur (Fig. 5 *B*). Operation had to be deferred until the hemoglobin level was gradually brought, by means of transfusions of

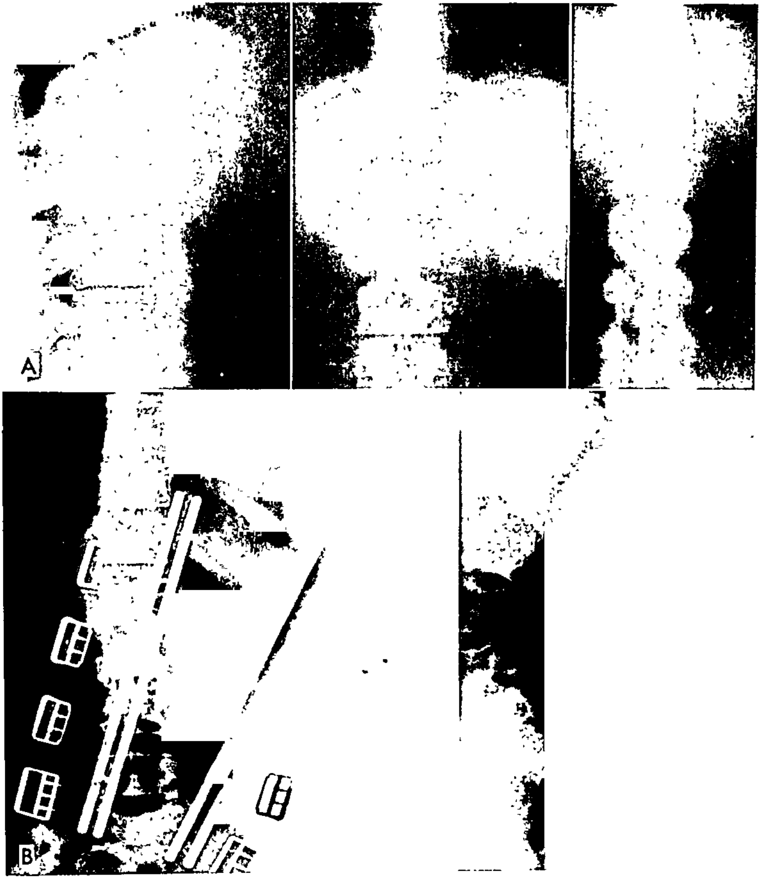

Fig. 7.—*A*, destructive spondylitis of first, second vertebrae, with laminographic studies. This lesion later proved to be Hodgkin's disease. *B*, film taken five months after spine [illegible] for Hodgkin's spondylitis of lumbar vertebrae.

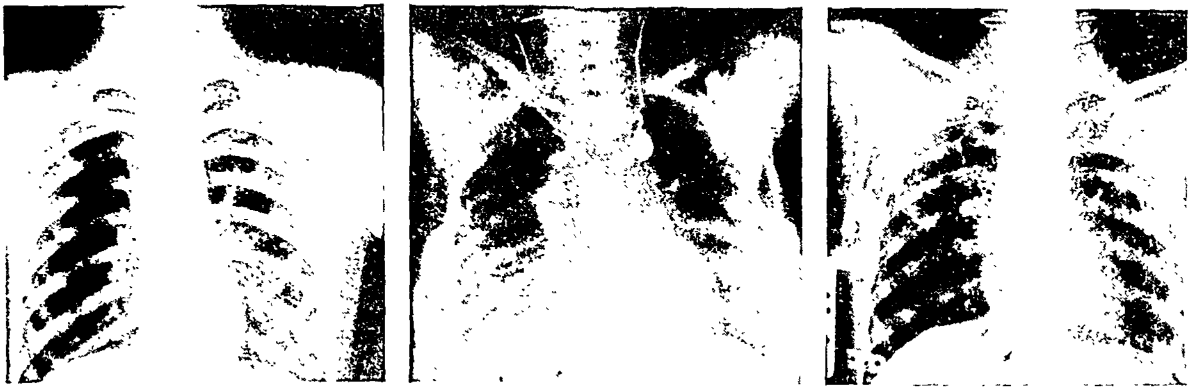

Fig. 8.—Check plate showing initial Hodgkin's mediastinal lymphadenopathy, progression and regression with nitrogen mustard therapy.

whole blood, from the level of 7.7 Gm. to that of 12.1 Gm.

On November 6 a Küntscher nailing was done. Because the femoral fracture was oblique, the intramedullary nailing was supplemented with a Parham band (Fig. 5 *B*).

Postoperatively the patient did well. Pain at the fracture site disappeared. Despite the paraplegia, nursing attention became much easier after fixation of the fracture of the femur. A sacral decubitus ulcer which had been present preoperatively healed, because it was now possible to turn the patient freely. At the time of writing the patient still has marked muscle weakness. Although doubtful that her paraplegia will ever permit her to walk, fixation of the fracture has made her care in the chronic ward infinitely easier for the nurses and more comfortable for herself. Roentgenograms taken on Feb. 16, 1953, revealed excellent callus information (Fig. 6).

Case 4.—J. B., a 15-year-old white boy, was admitted to the Stein Orthopedic Service of the Philadelphia General Hospital on April 16, 1951. His chief complain was pain in the midlumbar area of the back, of about one year's duration. Roentgenograms revealed a destructive lesion of the first and second lumbar vertebrae (Fig. 7 *A*). Despite good preservation of the intervertebral disc segment, the radiology department made a diagnosis of tuberculous spondylitis.

An extensive workup was done. The preservation of the intervertebral disc segment raised some question as to the diagnosis of tuberculous spondylitis. Tests with tuberculin of various strengths all gave negative. A low grade fever was present. Roentgenograms of the chest on May 2 revealed enlargement of *the mediastinal lymph nodes. This was considered due to tuberculous adenitis.*

From an orthopedic point of view it was obvious that a severe destructive lesion of the first and second lumbar vertebrae was present. The cause could not be clearly determined, but the advanced destruction made it necessary for some stabilization procedure to be performed if the patient were to resume a life without pain.

Accordingly, on May 27, a spine fusion operation from the twelfth thoracic to the fourth lumbar area was performed. In the ladder technic used, tibial bone was fashioned into two paraspinal upright grafts with interlocking crosspieces between the spinous processes.

The postoperative course was stormy. The patient's nutritional status was never good. The wound healed slowly, with several areas of reaction to catgut sutures. The fever continued for three months after the operation, despite the use of penicillin and streptomycin. The patient was finally discharged to his home on August 25, wearing a plaster of paris body jacket.

He was readmitted on November 2 for removal of the plaster jacket and was fitted with a Knight spinal brace (Fig. 7 *B*). Roentgen studies at this time revealed progressive enlargement in the mediastinal area. In addition, an enlarged lymph node in the left supraclavicular region was noted. Tuberculin tests on this admission again gave negative results.

On December 2 biopsy of a specimen from the left supraclavicular node was carried out. The lesion proved to be Hodgkin's disease.

Immediate high voltage roentgen therapy to the lumbar portion of the spine was instituted. Nitrogen mustard therapy in appropriate doses was also given. Note the reversal of the mediastinal lymphadenopathy (Fig. 8).

The subsequent therapeutic problem and the eventual unfavorable course of the Hodgkin's disease are not relevant to this presentation. Fusion of the spine in the involved lumbar area gave an excellent immediate therapeutic result as far as the disappearance of pain was concerned. This type of problem is, of course, extremely rare, as most lymphomas are more widespread at the time of their initial clinical detection.

SUMMARY

The orthopedist's role in the diagnosis and treatment of skeletal metastatic lesions is presented. The various origins of the carcinomas that commonly metastasize to the osseous system are reviewed. The roentgenographic and blood chemical data associated with the osteolytic and osteoblastic and mixed types are discussed.

Intramedullary nailing is shown to be clearly indicated for the stabilization of actual or impending pathologic fractures of the long bones. The particular application of the Küntscher intramedullary clover-leaf nail in pathologic fractures of the femur is illustrated by 3 cases.

A rare case of Hodgkin's disease, originating as destructive spondylitis of the lumbar spine, is reported. Temporary excellent clinical relief of back pain was obtained by a spine fusion operation. The subsequent lymphagenous dissemination was temporarily controlled by high voltage roentgen therapy and the use of nitrogen mustard.

ZUSAMMENFASSUNG

Es wird erörtert, welche Rolle dem Orthopäden in der Diagnose und Behandlung von Geschwulstmetastasen im Knochensystem zufallt. Es wird ein Ueberblick uber die verschiedenen Ausgangspunkte der Karzinome, die gewöhnlich zu Knochenmetastasen führen, gegeben. Die Befunde des Röntgengildes und der chemischen Blutuntersuchung, die bei osteolytischen, osteoblastischen und gemischten Formen von Knochenmetastasen auftreten, werden erörtert.

Die intramedulläre Nagelung ist eindeutig indiziert zur Schienung einer bestehenden oder drohenden pathologischen Fraktur der langen Röhrenknochen. Die spezielle Anwendung des Küntscherschen intramedullaren Kleeblattnagels bei pathologischen Oberschenkelbrüchen wird durch drei Krankheitsfälle erläutert.

Ein seltener Fall von Hodgkinscher Krankheit, die zu einer destruktiven Spondylitis der Lendenwirbelsäule führte, wird berichtet. Chirurgische Fusion der Wirbelsäule hatte klinische einen ausgezeichneten temporären Einfluss auf die Rückenschmerzen. Die später erfolgende lymphogene Aussaat der Erkrankung wurde zeitweilig durch Hochvolt-Röntgenbestrahlungen und durch Stickstoff-Lost kontrolliert.

RÉSUMÉ

Le rôle du chirurgien orthopédiste est préconisé lorsqu'il s'agit du diagnostic et du traitement de lésions métastatiques. L'auteur passe enrevue les lésions osseuses avec leurs métastases. L'auteur disserte aussi sur les examens de sang et de radiologie. Dans les fractures des os longs, l'usage de clou est préconisé; en particulier celui de Kuntscher dans les fractures du fémur. L'auteur rapporte un cas curieux de maladie de Hodgkin's avec complications osseuses de la colonne lombaire. Le traitement de la douleur fut fait par une fusion osseuse de la colonne tandis que la dissémination lymphatique fut arrêtée par la radiothérapie.

RESUMEN

Se presenta el papel del ortopedista en el diagnóstico y tratamiento de las metástasis esqueléticas. Se revisa los diversos origenees de los carcinomas que comunmente metastatizan el sistema esquelético. Se discuten los datos químicos y roentgen-

patient began to pass part of her urine through the vagina. He stated that the operation was not a difficult one, and that he was very much surprised at this development.

A speculum was placed in the vagina and at the right upper fornix a small opening was observed, through which urine passed. A catheter could not be passed up this fistulous tract.

Cystoscopic examination revealed normal bladder mucosa. A No. 6 catheter was inserted in the left ureter to the kidney pelvis, meeting no resistance. The right catheter passed about 3 cm. and met obstruction. Many attempts were made with catheters of different sizes but none would pass the constriction. Indigo carmine returned from the catheter in the left kidney in four minutes. No dye was seen passing out from the right orifice, but examination of the urine coming from the vagina revealed a blue discoloration.

An intravenous urogram showed both kidneys to present a very good appearance, and the opaque medium was seen in the vagina (Fig. 1 *A*). This was definitely a ureterovaginal fistula.

Nephrectomy was the procedure of choice because of the high stricture of the ureter, the age of the patient, her poor financial condition and a good functioning kidney on the left side. The interval between the two operations was approximately four months, right nephrectomy being performed on May 1. The patient made an uneventful recovery.

CASE 2.—Mrs. M. G., aged 20, came for consultation complaining of incontinence of urine. Her physician told me that during the repair of a third-degree laceration considerable hemorrhage was present on the left side and that it was controlled by grasping the tissue with a hemostat and many deep sutures. The surgeon thought that during this procedure the left ureter was ligated or ruptured by the needle. Two days after the operation severe pain was present in the region of the left kidney. The pain lasted for about three days and was relieved after urine began to appear through the vagina.

On May 1, 1948, a No. 24 cystoscope was passed without difficulty. The urethra and bladder were normal. The left ureteral orifice was swollen and distended, and a No. 6 catheter passed only 1.5 cm. The right orifice was essentially normal and a No. 6 catheter passed, meeting no obstruction. The indigo carmine passed from the right catheter in four minutes, but no dye passed through the left ureteral orifice. At this time an intravenous pyelogram was taken. Diodrast made its appearance from the right kidney in five minutes, but there was some delay in its appearance from the left kidney. The pyelogram revealed hydronephrosis with pyelonephritis on the left side (Fig. 1 *B*) and a normal kidney on the right side.

On May 28 the left kidney, which showed pyelonephritis with hydronephrosis, was removed. Recovery was uneventful, and the patient's general condition was very good at the time.

CASE 3.—Mrs. D. F., aged 38, came to the office complaining of pain over the bladder region and in her left groin. A hysterectomy had been done in February 1947. The patient stated that she had not "felt good" since that time.

Cystoscopic examination on July 31 revealed an essentially normal urethra and bladder, but a catheter could not be passed up the left ureter beyond 4 or 5 cm. (Fig. 2 *A*). There was definite obstruction, and after two attempts with catheters and bougies the obstruction still could not be passed. The right kidney was apparently normal, and indigo carmine returned from the catheter in four minutes. An excretory urogram showed a partially functioning left kidney. The catheter was passed up the left kidney to the obstruction and 10 cc. of sodium iodide injected. The iodide passed up the catheter and a satisfactory film was made.

On November 4, with the patient under sodium pentothal anesthesia, a midline incision was made extending through the fascia, separating the muscles and opening the peritoneum. The posterior peritoneum was opened, dense adhesions were observed around the ureter. These adhesions were freed, and from all appearances the ureter had been ligated. Closure was done as usual without drainage.

At cystoscopic examination Feb. 6, 1948, Nos. 6 and 7 catheters passed up the left ureter with ease. Phenolsulfonphthalein was injected into the vein and returned in three minutes. On the other occasion the indigo carmine returned through the left orifice very faintly in twelve minutes. The patient still had some discomfort in the pelvis, although she had greatly improved.

CASE 4.—Mrs. M. P., aged 27, came to the office on Feb. 25, 1949, complaining of pain over the right kidney. This pain began a few days after she underwent a hysterectomy after a uterine rupture on January 24. Her physician informed me that the day after the operation severe pain developed in the right lumbar region, which continued for about a week. The pain was intense and required opiates. She had a stormy convalescence and was in a weakened state at this time.

The patient had been married for four years, and two years prior to the January 1948 episode had undergone a cesarean section Her doctor had planned a second cesarean section, but one week in advance of the scheduled operation a ruptured uterus, with its resultant severe pain and abdominal distress, caused her collapse. Her physician stated that there was considerable hemorrhage present in the right broad ligament and that numerous sutures were necessary; hence, he was not surprised at the accident.

Cystoscopic examination revealed normal urethral and bladder mucosa. A No. 6 catheter passed up the left side with ease; however, a No. 4 encountered blocking about 6 cm. above the right orifice. Indigo carmine appeared from the left side in three minutes and concentrated well in six minutes. The dye appeared faintly from the right side in five minutes and concentrated in ten minutes. Pyelograms revealed a definite stricture formation about 6 cm. above the right orifice, which was just below the brim of the pelvis. The patient's physician thought that he had tied off the ureter, as the operation was very difficult and considerable hemorrhage was present. Figure 2 C shows the deformity in the lower third of the right ureter, which was damaged during the hysterectomy.

CASE 5.—Mrs. M. B. A., aged 73, was first seen in the office March 6, 1950, complaining of dribbling of urine and discomfort while wearing a urinal. Her general condition was fair for a woman of her age, but she had not regained her weight since undergoing an operation on January 5 for carcinoma of the rectum. Her general surgeon performed an abdominoperineal resection, a vaginal hysterectomy and a bilateral oophorectomy. The patient made an uneventful recovery and her condition was good until the ninth postoperative day, when she began to pass urine through the vagina. She left the hospital wearing a urinal, and after recuperating returned to see me for the vaginal leaking.

Cystoscopic examination revealed normal mucosa, with the orifices in the usual position. No vesicovaginal fistula was present. The right ureter was catheterized, but the catheter was blocked about 8 cm. up the left ureter. Indigo carmine returned from the right in six minutes. No urine came out through the left catheter. The drainage from the vagina was a pale blue color.

Pyelograms were made by injecting a contrast media up the catheters. The right kidney was essentially normal. A pocket about 4 inches by 1 inch (10 by 2.5 cm.) was present in the lower third of the left ureter. An intravenous pyelogram was made, which revealed some dilatation of the left kidney pelvis and calyces with delayed emptying .

After much deliberation left nephrectomy was decided upon as the procedure of choice, for the patient was very anxious to be relieved of the urinary drainage. A left nephrectomy was performed in the usual manner, and the patient underwent the procedure in an excellent manner. Her condition was satisfactory until the eighth postoperative day, when there occurred an elevation in temperature and a paralysis on the left side of the body. Her condition became worse, and a diagnosis of cerebral hemorrhage was made. The patient became conscious, but on the twenty-fifth postoperative day died of bronchial pneumonia.

CASE 6.—Mrs. V. W., aged 58, came to the Clinic complaining of urinary incontinence following a hysterectomy performed five months earlier. She had a stormy postoperative course, and urine began to leak from the vagina on the seventh postoperative day.

Cystoscopic examination revealed a normal bladder except for a large round right orifice of the golf hole type. A catheter passed up the left ureter, meeting no obstruction. There was blockage up the right ureter 2 cm. from the orifice. Urine could be seen in the upper right vaginal vault. Cystoscopic examination was done one week later, and the catheter passed into the right orifice, coming out through the vagina.

The left kidney was normal, and a right nephrectomy was advised, with repair of a vesicovaginal fistula if there should be a backflow of urine from the bladder into the vagina.

CASE 7.—Mrs. E. L., aged 55, was admitted to the hospital with the chief complaint of pain in the rectum and blood in the stools.

These symptoms had been present for one year. The patient stated that there had been no pain in the rectum until the time blood was noticed in the stools. She began losing weight, felt weak, became restless and suffered [illegible] of appetite. Pain in the rectum became [illegible] and she continued [illegible]sing fresh bl[illegible] consulted her l[illegible] who mediate hospitalization. She stated that she had lost 50 to 60 pounds (22.7 to 27.2 Kg.) in weight in the past two years.

Carcinoma of the rectum was diagnosed by biopsy. Further examination revealed that the patient was otherwise in fairly good condition. The electrocardiogram was within normal limits. The patient's proctologist performed an abdominoperineal resection, completely removing the lower portion of the sigmoid and the rectum.

The patient was seen by me on Oct. 16, 1951, on the seventh postoperative day. At that time considerable drainage was present from the rectal wound and had been present for five days. She had been wearing a catheter in the bladder, although part of the urine still escaped through the lower rectal wound. Her condition was good except for the draining of the urine.

The patient was taken to the operating room for cystoscopic examination. The examination revealed much trauma to the left posterior lateral wall of the bladder, although no particular opening through the bladder mucosa was noted. It was observed that two areas in the posterior wall of the bladder might possibly have been punctured by needle, and some leaking might be flowing into the rectal wound. Catheters were placed in the ureters, and no obstruction was present in either. The catheters were left in the ureters for drainage. No leaking was present from the wound as long as the catheters were present, although after they were removed three days later urine returned from the wound. The patient was taken back to the operating room, the ureters were dilated and films were made. The pyelograms were essentially normal after removal of the catheters, and on injection of the media into the ureters the presence of a fistulous tract from the lower third of the right ureter into the wound could be detected (Fig. 3, *A* and *B*). The patient was advised to be up in a chair and to walk. No more leakage was present, and the wound rapidly healed. The patient left the hospital in good condition.

COMMENT

Obstruction of one ureter is encountered fairly often during cystoscopic examination and catheterization of the ureters. Pain may be present on the particular side or, on the contrary, there may be no symptoms. A careful history may date back to symptoms following pelvic surgical procedures.

During the past 4 months I have seen in the Clinic 2 patients who have undergone nephrectomy after pelvic operations. Both stated that the lesions in their cases were diagnosed as ureterovaginal fistulas.

SUMMARY AND CONCLUSIONS

Many unilateral ligations are not recognized but are discovered during cystoscopic procedures and catheterization of the ureters.

When complete anuria follows an extensive pelvic operation, one should consider occlusion of the ureters rather than adopt the diagnosis of suppression of urine resulting in death of the patient.

Bilateral nephrostomy is a life-saving procedure after double ureteral ligation when the patient's condition is grave.

After many attempts at ureteral catheterization have failed, open operation and transperitoneal deligation may prevent further destruction of the kidney.

Seven cases are reported. In Case 1, under normal conditions, transplantation of the right ureter into the bladder or sigmoid colon would have been done.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Einseitige Unterbindungen des Harnleiters bleiben häufig unerkannt, bis sie durch die Zystoskopie und Harnleiterkatheterisierung entdeckt werden.

Wenn nach einer ausgedehnten Beckenoperation komplette Harnverhaltung auftrit, soll man eher an einen beiderseitigen Harnleiterverschluss denken, als sich auf die Diagnose einer zum Tode führenren Unterdrückung der Harnproduktion einzulassen.

Wenn sich der Kranke nach beiderseitiger Harnleiterunterbindnug in bedrohlichem Zustand befindet, stellt die Beiderseitige Nephrostomie einen lebensrettenden Eingriff dar.

Nach dem Versagen wiederholter Versuche, die Harnleiter zu katheterisier-

en, kann ein chirurgischer Eingriff mit transperitonäischer Entfernung der Ligatur unter Umständen einer weiteren Zerstörung der Niere vorbeugen. Es liegen sieben Krankheitsberichte vor. In Fall Nr. 1 wäre unter normalen Voraussetzungen eine Einpflanzung des rechten Harnleiters in die Blase oder in das Colon sigmoideum ausgeführt worden.

RÉSUMÈ

Plusieurs ligatures de l'uretère sont découvertes à l'occasion d'un cathétérisme des uretéres. Si l'anurie fait suite à une intervention chirurgicale sérieuse des organes pelviens, il faut incriminer une occlusion mécanique des uretéres plutôt qu'une cessation de la sécrétion réanle. La *néphrostomie bilatérale en a sauvé plusieurs.* Si une tentative de cathétérisme des uretéres èchoue, il faut réintervenir pour *défaire la ligature sur l'uretère afin* de prévenir la destruction du rein. L'auteur rapporte 7 cas.

CONCLUSIONI RIASSUNTIVE

Parecchi casi di legatura accidentale di un uretere passano inosservati, ma vengono rivelati in corso di cistoscopia o di cateterismo degli ureteri. Quando un'anuria segue una operazione radicale praticata su organi pelvici, è meglio considerare la possibiltà che siano stati legati accidentalmente entrambi gli ureteri piuttosto che far diagnosi di anuria riflessa mortale. In questo caso la nefrostomia bilaterale salva la vita del paziente. Dopo aver fatto senza successo vari tentativi di cateterismo urterale si deve ricorrere all'intervento chirurgico e alla slegatura transperitoneale degli ureteri, al fine di prevenire na distruzione completa dei reni. Vengone riferiti 7 casi. In uno di essi si sarebbe potuto fare, in condizioni normali, un trapianto dell'uretere dentro nella vescica o nel sigma.

SUMÁRIO E CONCLUSÔES

Muitas ligaduras unilaterais dos ureters não são identificadas sinão pelo uso processos cistoscopicos e pela sua cateterisação.

Surgindo uma anuria completa em posoperatório de extensa intervenção pelvica, deveremos sempre considerar a possibilidade de oclusão dos ureteres, ou então aceitarmos o diagnostico de anuria, o que resultará na morte do paciente.

A nefrostomia bi-lateral é um processo salvador, nos cssos de ligadura dos dois uréteres, se as condições gerais do paciente são graves.

São registrados sete casos, sendo que no primeiro doente, em condiçoes satisfatórias, poderia sêr feita a transposição do ureter direito na bexiga ou no colo sigmoide.

RESUMEN Y CONCLUSIONES

Muchas ligaduras unilaterales no se reconocen, pero son descubiertas durante procedimientos cistoscópicos y cateterización de los uretérs.

Cuando siguiendo a una operación mayor en la pélvis se desarrolla anuria completa, se debe considerar la oclusión de los uretérs en vez de adoptar el diagnóstico de supresión de orina resultante en la muerte del paciente.

La nefrostomía bilateral es un procedimiento vital desqués de la ligadura ureteral cuando la condición del paciente es grave.

Después de que muchos intentos de ca*teterización ureteral han fallado, una ope*ración abierta y la lisis de la ligadura transperitoneal puede prevenir la destruc*ción posterior del riñón.*

Se comunican siete casos. En el Caso I, bajo condiciones normales el transplante *del uréter derecho a la vejiga ó al sigmoide* podria haberse hecho.

Technical Aid in Esophageal Diverticulectomy

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RECENTLY, interest in the esophagus has revived. In the past, examination and treatment of esophageal lesions was difficult and hazardous. Now, with newer surgical and roentgen ray technics, the correct diagnosis can be made, and operations on the esophageal gastric canal have become established procedures. The interior of the esophagus can be accurately visualized; however, a correct diagnosis can be made in most cases on the basis of the history, physical signs and roentgenologic examination.

Ninety-five per cent of all esophageal diverticula occur at the cricopharyngeal juncture. Many years ago, Lord Moynihan showed conclusively that the lesion is really a hernia of the pharynx through the inferior constrictor muscle. McNealy[1] used the term "pharyngoesophageal diverticulum" and noted an incidence of 0.1 per cent, with male patients outnumbering female patients 3:1.[2] Dunhill[3] expressed preference for the term "pharyngeal diverticulum."

Clerf[1] reported that in all but 2 of 186 cases of pulsion pharyngeal diverticula arising from the left lateral wall. The diverticula may vary in fluid capacity from a few cubic centimeters to huge sacs containing several hundred cc.'s of fluid and masticated food.[2] The majority measure between 2.5 and 5 cm. in their greatest diameter.

The three most common symptoms of pharyngeal diverticula are dysphagia, regurgitation and noisy deglutition. Pressure on the side on which the diverticulum lies will force air from the pouch, producing a loud gurgling sound. Noisy deglutition is of interest since it is seldom encountered in any other lesion producing dysphagia.

Shallow and Clerf[4] pointed out the desirability of maintaining the upper portion of the esophagus in the anatomic midline during ligation of the sac, and prefer to insert an esophagoscope during the entire repair. Terry[5] also advocated a flexible Cameron surgical light. Isolation of the diverticulum under direct vision by the easy insertion of such an instrument by even an inexperienced anesthestist without necessity of laryngoscopy or difficult manipulation is of practical technical value. A typical case is submitted to demonstrate the use of the flexible lighted probe.

REPORT OF CASE

A 55-year-old white woman was admitted to the Spartanburg General Hospital on Jan. 2, 1952, complaining chiefly of hoarseness of two months' duration. She had noticed a burning sensation in the substernal area for about five months.

Physical examination revealed the patient to be well developed and moderately obese. There was moderate hoarseness and dyspnea, with two-pillow orthopnea. The pharynx was clear and no lymphadenopathic signs were present. A small, questionable mass was palpated just above the jugular notch in the midline; however, this was inconstant. No crepitus or unusual sensation associated with swallowing was elicited in the neck.

The clinical diagnosis from the history and physical examination was possible extrinsic pressure on the upper portion of the esophagus or esophageal diverticulum. (A gastrointestinal series and esophagoscopic study done elsewhere four months earlier had been reported as showing no abnormality.) Roentgen examination of the upper part of the gastrointestinal tract at Spartanburg General Hospital revealed an esophagus of normal length. There was an esophageal diverticulum meas-

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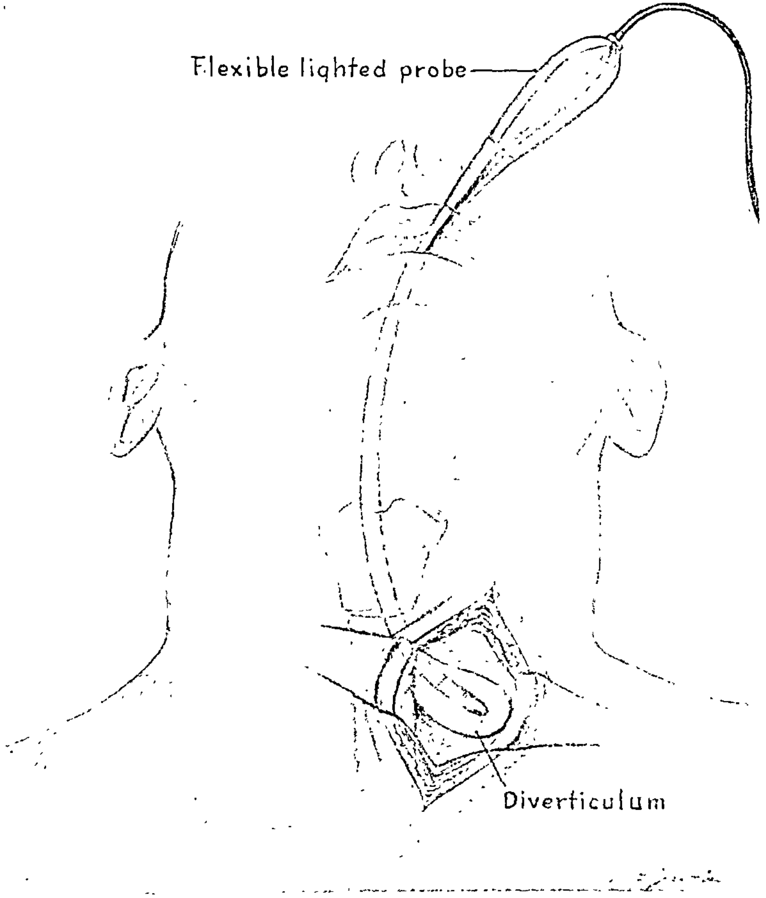

Fig. 1.—Use of flexible lighted tube in a case of esophageal diverticulum, anterior view.

uring 2.5 by 2.5 cm. and projecting from the right posterior aspect at the level of the proximal end of the first rib. The diagnosis was pulsion diverticulum of the proximal portion of the esophagus.

With the patient under endotracheal cyclopropane anesthesia, an oblique incision made along the medial margin of the st cleidomastoid muscle. The muscle and ca sheath structures were retract r

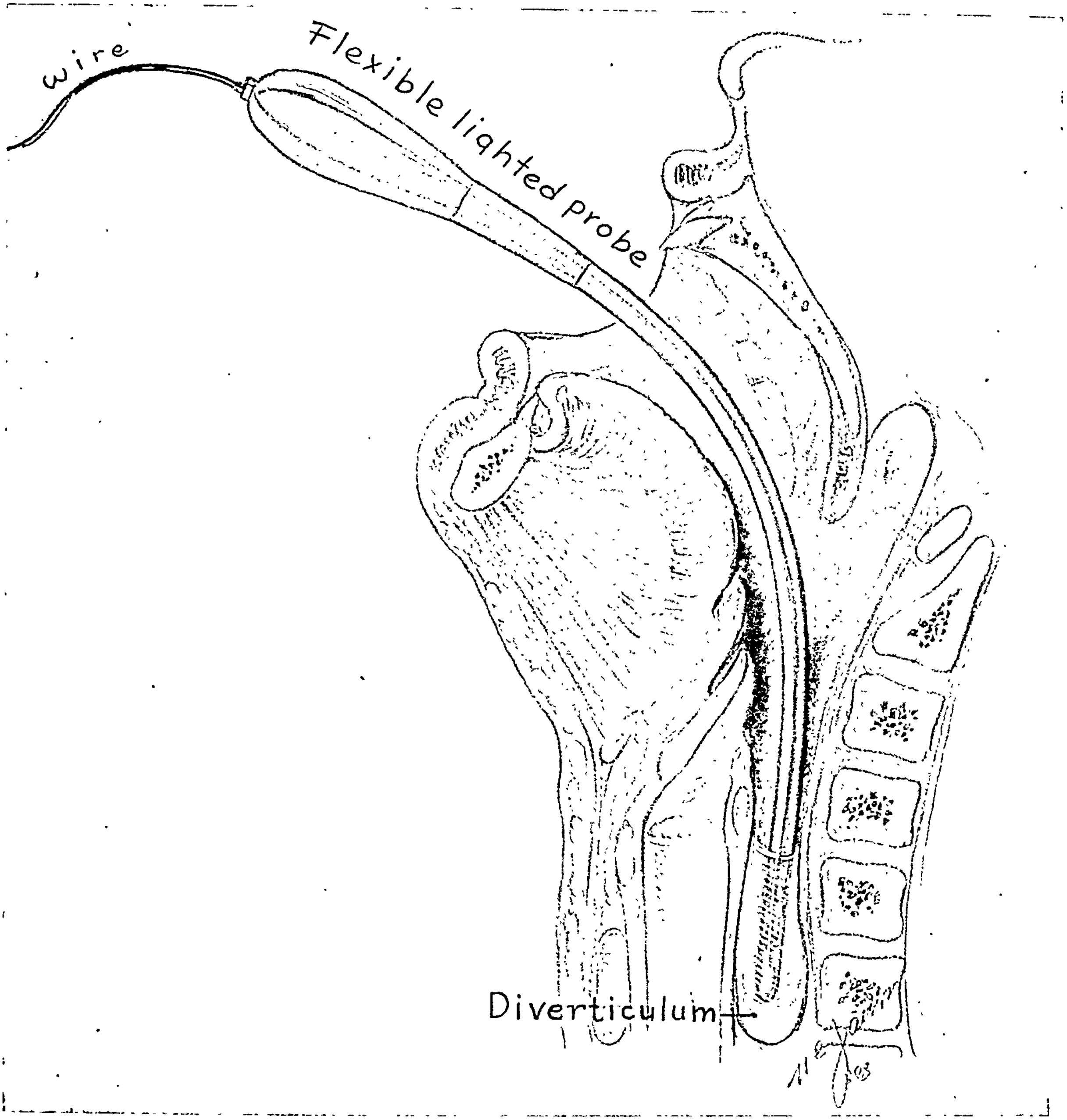

Fig. 2.—Use of flexible lighted tube in a case of esophageal diverticulum, lateral view.

the pretracheal muscles medially. The middle thyroid vein was divided and ligated. At this time the lighted flexible probe was inserted by the anesthetist into the esophagus and guided into the diverticulum quickly and without the need of a laryngoscope or an esophagoscope. If the probe was turned slightly to the right, the light could be inserted into the sac; if turned to the left, the probe would always go into the esophagus. Under direct lighted vision, the diverticulum was excised. Grossly the sac measured 1.5 by 2 cm., appeared thin-walled with a wide stroma, and arose at the cricopharyngeal juncture posteriorly and on the right. A 2 mm. cuff was used for 3-layer inverting closure with cotton. The esophageal lumen was not constricted after closure of the diverticulum. The incision was closed in layers without drainage. Cotton sutures were employed as ligatures. The skin was closed with clips. A Levine tube was inserted by the anesthetist, and gastric suction was instituted. Tube feeding was begun one week after the operation, and liquid diet was started after removal of the tube on the ninth day. The wound healed well *per primam*. There was no swelling in the region of the incision. The patient left the hospital ambulatory and asymptomatic on the fourteenth postoperative day.

SUMMARY

One-stage excision of a diverticulm of the esophagus (herein described) constitutes a safe and effective method of treatment. The use of a flexible lighted probe to simplify surgical removal in cooperation with the anesthetist is recommended.

ZUSAMMENFASSUNG

Die hier beschriebene einzeitige Resektion eines Speiseròhrendivertikels ist ein gefahrloses und wirksames Behandlungsverfahren. Es wird die Anwendung einer biegsamen erleuchteten Sonde empfohlen, um die in enger Zusammenarbeit mit dem Anästhesiologen erfolgende chirurgische Entfernung des Divertikels zu vereinfachen.

SUMARIO

A excisão em um só tempo, dos diverticulos do esôfago constitue um processi eficiente e salvador para o seu tratamento. Detalhes para iluminação do campo, em colaboração com o anestesiologista, são recomendados pelos autôres.

RIASSUNTO

L'asportazione in un tempo dei diverticoli esofaghi costituisce un sicuro ed efficace metodo di cura. Viene raccomandato l'uso di una sonda flessibile illuminante allo scopo di semplificare l'intervento chirurgico in cooperazione con l'anestesista.

RESUMEN

La extirpación en un tiempo del divertículo del esófago (aqui descrita) contituye un procedimiento sencillo y un método terapeútico efectivo. El uso de un catéter flexible para simplificar la extirpación en coperación con el anestesista se recomienda.

RESUMÈ

L'excision en un temps d'un diverticule de l'oesophage est un procédé efficace et sûr pour cette affection. On recommande l'usage d'une canule souple, éclairant, pour faciliter cette opération.

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Retinoblastoma

Report of a Case

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IT is not my aim in this paper to review the literature on heredity, histopathology, diagnosis, prognosis or treatment of retinoblastoma, but I wish to emphasize, by reporting the case of an unfortunate child, the fact that retinoblastoma is not primarily a local and cranial disease but a highly malignant disseminated neoplasm. An analysis of 17 autopsies by Merriam[1] indicates a similar conclusion.

REPORT OF CASE

A three-year-old Hindu girl was brought to me on Dec. 12, 1950, because her parents had noticed "something white" through the dilated pupil of the left eye. External examination revealed no sign of exophthalmos. The left eye had ciliary injection; the cornea was clear, the anterior chamber shallow and the pupil dilated and fixed. On throwing a beam of light through the pupil, it was easy to visualize, even without the aid of any apparatus, a whitish mass behind the lens. The intraocular tension was very high. The eye was what is described as an amaurotic cat's eye. Ophthalmoscopic examination showed a greyish white mass behind the lens, with blood vessels coursing over it. The mass completely obstructed study of the other eyegrounds. The tumor was developing from the temporal side of the eyeball. The glaucoma was secondary to the space-occupying lesion. The right eye was completely normal. There was no family history of such a condition up to two generations.

An enucleation was strongly advised, but, being high cast Hindus, the parents were reluctant, because a mutilated girl would become a parasite on them. They took their child away to their village. The blastoma, however, had no respect for either the sex or the religion of the poor child, and the glaucoma became worse, till the little patient was in a most distressing condition when she was again brought to me, fully five weeks after the first consultation, the indigenous drugs and quacks having failed to arrest the monstrously rapid development of the tumor.

The child was admitted to the hospital on Jan. 23, 1951, and an enucleation of the left eyeball was performed with oper-ether anesthesia. The bulbus was not perforated during or before the operation, and a fairly long piece of the optic nerve was sectioned. A 13-mm. plastic ball implant was buried in Tenon's capsule. The four rectus muscles were sutured over it. The postoperative period was uneventful. The right eye was checked and found normal. The patient was discharged on the eighth postoperative day, with a confirmor in the eye socket and instructions to report after four weeks.

As usually happens in India—the India that exists in each of her 500,000 villages—the child was not brought as advised for a checkup, since, so far as the relatives were concerned, the child had had her treatment. To the public, the fuss of follow-ups and checkups demanded by the specialist of Western medicine seems unnecessarily time-consuming, and the poor Indian patients have their duties, livelihoods and religious ceremonies to attend to.

On August 11, seven months after the enucleation, the patient was brought to the hospital because there was a slight prominence on the inferotemporal side of the socket and some conjunctival tissue was protruding from the palpebral fissure, especially inferomedially. There was a history of a fall, by which the child had hurt the right forearm and possibly the left side of the face. The first impression was that of an inferotemporal dislocation of the implant. There was some bluish

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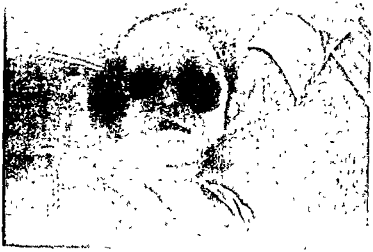

Fig. 1.—Enormous fungating mass (retinoblastoma) protruding from left orbit in a child aged 3 years.

discolouration of the skin of the left lower lid. The child was again operated upon for removal of the displaced implant and reinsertion of a new one. On reflection of the conjunctiva, which had become moderately vascularized, the implant appeared to be still secure in Tenon's capsule. A mass of tissue from the nasal side of the socket was seen pushing forward. It was easy to realize then that a recurrence had occurred, which is rather unusual after an enucleation *in toto* of the affected eyeball. Specimens of tissue were excised for biopsy. The implant, however, was removed, as it was being pushed forward, downward and outward, stretching the skin of the lower eyelid.

The biopsy specimens were examined microscopically at the Haffkin Institute, Bombay, which reported: "Sections of growth from the eye socket showed appearances suggestive of retinoblastoma," and also at Eye Pathological Laboratory, Massachusetts Eye & Ear Infirmary, Boston, Massachusetts, from which the report was as follows: "For the most part, there are seen to be numerous small, round cells resembling those from retinal epithelium, either masses or strands, accompanied by considerable necrosis. There are bands of fibrous tissue, the latter well preserved. There is a suggestion of tendency toward forming rosettes in a pattern. The specimen shows an epithelial border, very slight acanthosis, and a slight hyperkeratosis. Beneath the epithelium are a few strands of nevus cells, and deeper still there are suggestions of fibrous proliferation by accumulations of the young fibroblasts that show very clearly, and some chronic inflammatory cells. There is a moderate supply of blood vessels and a considerable amount of fibrous and connective substance."

The skiagram of the orbit and skull showed no evidence of a bony lesion thus far. Exenteration of the left orbit was proposed but was refused by the parents. The child was again taken home. A month later she was again brought to the hospital, this time with a huge fungating bleeding mass protruding from the left orbit between the eyelids, which were widely stretched and retracted over the growth (Fig. 1). The exenteration was permitted, but because of the size and vascularity of the tumor it was suggested that a few roentgen irradiation treatments should be given to reduce the size of the fungating mass. Treatment was started with 140 r, 140 Kv., with filtration of 0.25 mm. copper and 1 mm. aluminum. The dose was increased to 175 r at 180 Kv., with the same filters except that the 0.25 mm. of copper was replaced by 0.5 mm. The total surface dose given was 3,325 r in twenty-one treatments. It was remarkable to watch the gradual yet rapid shrinkage of the tumor mass, which ten days after the last exposure completely regressed to the palpebral fissure area (Fig. 2). The lids were entirely normal, and the growth was limited to the socket within the orbital margins.

Now was the time for an exenteration, but the relatives thought otherwise, being quite happy with the result of the irradiation therapy. Warnings of possible recurrence and metastasis remained unheeded. The thought of the gross mutilation of the girl's face after

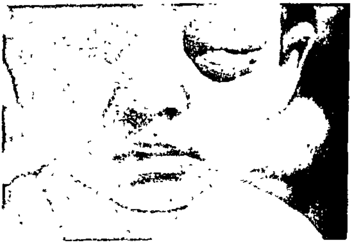

Fig. 2.—Regression brought about by roentgen therapy in preparation for ex[illegible] of the orbit. The child's parents withd[illegible] for the operation, thinking the [illegible] ciently improved. The child died [illegible] metastasis.

the exenteration was abhorrent to the family, and it was told that, should a recurrence occur, the child would be better dead than alive with such a disfigurement.

Tragic as it is, the tumor began to increase in size three weeks after the last exposure and ultimately reached huge proportions. The child died a pathetic death soon afterward of cachexia and metastasis. A postmortem study was naturally not permitted.

COMMENT

The orbital metastasis of the growth is uncanny, in view of the fact that the eyeball was removed *in toto* and with a good length of healthy optic nerve. Jain,[2] reviewing his statistics, mentioned that the nature of the tissues involved is immaterial as long as the neoplasm is strictl intraocular and that enucleation alone is sufficient to obtain a radical cure. He added that it is as good as enucleation followed by irradiation. In his series, 9 patients with choroidal infiltration were treated with enucleation only, and none had a recurrence. Again if according to Duke-Elder (cited by Japha[3]) there is a discontinuous spread of tumor nests in the optic nerve, it necessitates enucleation combined with intracranial surgical treatment. The excised part of the nerve may not show evidence of extraocular glioma.

However, Fricke[4] and his co-workers expressed the opinion that there is no definite rule when radiation therapy rather than enucleation is indicated in cases of retinoblastoma. The case reported by Despons and Pesme[5] well illustrates the utter malignancy of the lesion. An enucleation was done in a proved case, followed immediately with high voltage roentgen irradiation (200 r given 34 times to the orbit) which was in turn immediately followed by subperiosteal exenteration. The patient, a child, died nevertheless of metastasis to the skull, the limbs and the cervical ganglia. One can have little faith in the efficacy of roentgen therapy, though isolated cases are reported in which the reverse is true, like that of Velhagen;[6] also according to Reese and his associates,[7] the method of irradiation employed by them does not decrease the chance of survival.

One must not forget, however, that the phenomenon of spontaneous regression is firmly established. Wustenburg[8] reported 2 cases of bilateral retinoblastoma, in each of which enucleation of the worse eye was performed, the diagnosis confirmed by histologic examination. Regressive changes in the tumor growth in the retained eyes occurred. Even after a respective period of eight and eleven years the vision remained normal. Baltin[9] stated the opinion that the arresting and destroying effect of irradiation on the tumor is transitory. He also cited a case similar to the one here presented, in which recurrence occurred after enucleation. Roentgen treatment caused it to disappear rapidly, but further recurrence soon supervened and the child died of cerebral metastasis. Baltin concluded that the retinoblastoma is of varying malignancy and is vulnerable to roentgen therapy only when the degree of malignancy is low.

Consideration of the poor capacity of the retina around the neoplasm to produce a reactive growth of connective tissue might be well worth postulating as the possible cause of failure of irradiation therapy.

SUMMARY

A proved case of recurrence of the neoplasm retinoblastoma after enucleation is reported, in which roentgen therapy failed to arrest the metastasis and destroy the lesion.

RESUMEN

Se comunica un caso de retinoblastoma recidivante desqués de enucleación, en el cual la terapia roentgen fracaso para combatir a las metástasis y destruir la lesión.

ZUSAMMENFASSUNG

Es wird über einen bewiesenen Fall von Retinoblastom, in dem es nach Enuklea-

tion zu einem Rückfall kam und Roentgenbehandlung ausser Stande war, die Geschwulst zu *kontrollieren oder* zu zerstören, berichtet.

RIASSUNTO

Viene riferito un caso certo di retinoblastoma recidivato dopo l'enucleazione e nel quale la roengenterapia non riuscì a impedire le metastasi e a distruggere la lesione.

RÉSUMÈ

L'auteur rapporte un cas de récidive de rétino-blastome après énucléation, cas où la radiothérapie n'a pas empêché la métastase.

SUMARIO

E registrado um case de recidiva de um retino-blastôma, após enucleação, em o qual falhou a roentgenterapia, tanto no evitar a metastase como no destruir a lesão em si.

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Miscarriage Caused by Unsuspected Pelvic Tuberculosis

Report of a Case

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PREGNANCY superimposed on pelvic tuberculosis, particularly tuberculous endometritis, is extremely rare. The case reported here is of a young woman in whom miliary tuberculosis developed after three abortions, leading me to suspect pelvic tuberculosis.

REPORT OF CASE

The patient, aged 31, was admitted to the hospital on Jan. 8, and discharged on Jan. 9, 1950. In 1944 she had had catarrhal Jaundice of four months' duration. She had never undergone surgical treatment. The first menstrual period occurred at the age of 15. The cycle was every twenty-five to twenty-eight days, the duration seven days and the flow moderate.

The patient had been married four years and had no children. A miscarriage at three months had occurred in her home on June 13, 1948. On Feb. 1, 1949, she had a miscarriage at two months, with subsequent bleeding. She was admitted to the Union Hospital and a dilation and curettement was done on February 28. She left the hospital in good condition.

At examination on September 1, the patient weighed 117 pounds (53.1 Kg.) and "felt fine." On December 10, she was seen in the office. She had no menstrual period since October 28; the breasts were sore. The weight was 129 pounds (58.5 Kg.). The uterus was twice the normal size. She was given Stilbesterol, 5 mg. twice daily. Examination on December 29 showed the uterus 5 fingerbreadths below the umbilicus, full. The patient was "fine" and had no complaints.

On Jan. 4, 1950, she began to bleed. Bed rest and other medication were ordered, but the bleeding continued. On January 8 it became heavy. The patient was admitted to the Union Hospital, and on the next morning, January 9, dilation and curettage were done in the usual manner.

Considerable tissue was present; this was removed. It took the patient about a month to get back to normal. She had an increased temperature and an accelerated pulse rate, up to 100 during this time. She did not feel well. She had been given penicillin, vitamins and other restorative medicaments.

On April 15, the patient called, stating that she had had no periods yet and felt weak and tired. She was told to come in. Examination then showed a temperature of 100 F.; the uterus was anterior and small, and the pelvis was clear. She stated that she had been coughing, and examination of the chest revealed many moist rales. A roentgenogram was taken and showed miliary tuberculosis. The patient was immediately sent to the Union hospital under the care of Dr. Samuel Brown, where Dr. Brown treated her from April 16 to May 7. Then she was sent to the Tuberculosis Hospital by transfer.

During her stay at this hospital the patient was decidedly ill. On November 15 a spinal tap showed meningitis. Cultures of material from gastric lavage gave positive results. This case was discussed with Dr. Connerty, the pathologist, and a reexamination of the slides was done. The slides showed tubercles in the placental tissue. Caseous matter was also present in the endometrium, and there were also many areas of caseous matter.

Examination of Tissue. — The curettings showed decidua spongiosa. The stroma of the decidua was heavily infiltrated with round cells, polymorphonuclears and macrophages. Lying free within the lumens of the decidual glands were aggregates of macrophages and polymorphonuclear cells. There were also miliary aggregates of epithelioid cells of microscopic dimensions, resembling the epithelioid

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cells of miliary tubercles. No giant cells or caseation necrosis was observed. Without the clinical knowledge that the patient had tuberculosis, these lesions would easily have been overlooked. Relatively large areas of coagulation necrosis were present; but these are commonly seen in curettings after a miscarriage, so it cannot be definitely postulated that these areas of necrosis were the result of tuberculous infection. However, the general overall picture is consistent with the diagnosis of tuberculous endometritis associated with a few abortive noncaseous miliary tubercles.

Close study of the placenta in the light of the patient's clinical history showed a few miliary tubercles either attached to or developing within the chorionic villi. The majority of these were aggregates of epithelioid cells of microscopic size, from which giant cells are absent. However, two tubercles containing giant cells and caseous centers were observed. Except for these lesions, no changes were apparent.

The pathologic diagnosis was tuberculous endometritis associated with a few abortive noncaseous miliary tubercles, with miliary tubercles in the placenta.

Pelvic Tuberculosis.—Pelvic tuberculosis is rarely primary. Five to 7 per cent of all pelvic inflammatory diseases are due to tuberculosis. Jameson[*] reported that, of a large number of consecutive autopsies pelvic tuberculosis was present in 1 per cent. Myer Rugg[*] stated that 10 per cent of tubercular women have pelvic tuberculosis. Pelvic tuberculosis occurs in the following sites, in order of frequency: the Fallopian tubes, the uterus, the ovaries, the cervix, the vagina (rarely) and the vulva (very rarely). Tuberculosis of the tubes is bilateral in 99 per cent of cases, and in 68 per cent there is peritoneal involvement also.

Tuberculosis of the vulva and the vagina may be either primary or secondary; it is clearly secondary in 85 per cent of cases. The disease may be either ulcerative or papillary; in 80 per cent it is ulcerative. In the presence of advanced papillary tuberculosis ulceration also occurs, and the diagnosis can be made only by microscopic examination. Frequently tuberculosis of the vulva and the vagina is mistaken for carcinoma, sarcoma or syphilis. Excision is the best hope in these cases.

Tuberculosis of the cervix is a relatively rare disease. It is occasionally mistaken for carcinoma owing to the ulceration or growth that is present. It produces a discharge and bleeding. Tuberculosis of the ulcerative type is usually a simple, single lesion. The papillary type resembles carcinoma in appearance; occasionally a large polypoid mass may extend through the external os. In the presence of miliary tuberculosis of the cervix, the cervix is swollen. Interstitial or intermural cervical tuberculosis leaves large cavities in the cervix. The diagnosis is made on microscopic examination, with further confirmation by animal inoculation. The treatment is usually panhysterectomy, occasionally a high amputation. Tuberculosis of the cervix can be considered primary only when that organ is the sole seat of infection. Papillary and ulcerative tuberculosis may simulate carcinoma clinically.

Tuberculosis of the Ovary.—This is usually secondary to tuberculosis of the peritoneum, the mesentery, the glands or the tubes. The tubes may pick up tuberculosis from the ovary. Tuberculous abscess of the ovary may be due to contagious tuberculosis of the tubes.

Tuberculosis of the Endometrium.—Almost invariably, tuberculosis of the endometrium is secondary to tuberculosis of the tubes. It is not easy to demonstrate tubal tuberculosis even when it is present. One is justified, when tuberculosis of the endometrium is revealed by curettage, in suspecting that tuberculosis exists elsewhere. In the early stages, only an occasional tubercle or cluster of tubercles with characteristic epithelial and giant cells is present. Chronic inflammatory disease is usually present. The body of the uterus is a fairly frequent site of tubercular infection. In 30 to 35 per cent of all cases of genital tuberculosis the disease is present in the uterus. There may be endometritis, myometritis or perimyometritis, or a combination of all of

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In Curtis's, *Obstetrics and Gynecology*, Vol. 2, p. 261.

Tuberculosis of the endometrium is next to tuberculosis of the tubes in frequency. It is generally due to a hematogenous infection or to an extension along the mucosa of the tubes. The treatment is usually hysterectomy, owing to the fact, that when the adnexae are involved, tuberculosis of the endometrium is usually present. Infection in the uterus is usually secondary.

Pathologic Picture: Miliary tubercles are present in 80 per cent of cases of endometrial and myometrial tuberculosis. Ulceration is present in 20 per cent. Microscopically the endometrium shows a chronic infection, with tubercles and giant cells. Caseous material is present. Tuberculosis of the endometrium gives rise to a leukorrheal discharge which may be thin or watery, in the later stages, thick, odorous and cheesy. Dysmenorrhea is frequently present.

Tuberculosis of the Tubes.—Tuberculous salpingitis accounts for 5 per cent of all pelvic inflammatory diseases.

1. The tube most frequently is involved by the hematogenous route from foci elsewhere, especially the lungs.
2. The condition may result from extension of peritoneal tuberculosis through the lymphatics.
3. Direct invasion from an adjacent ulceration may occur, or invasion from adherent tubercular glands or tuberculous ulcers of the intestines.

The important feature is that, with few exceptions, the primary seat of the disease of the genital tract is the tubes. From them, descending infection invades the endometrium, the cervix, the vagina and, rarely, the vulva.

Pathologic Picture: The ends of the tubes are open, inverted and fimbriated, whereas in a patient with carcinoma of the genital tract the ends though fimbriated, are closed. In G. C., closed fimbriated ends are observed. The diagnosis is usually made microscopically and not macroscopically. In the peritoneal type of tuberculosis the tubes are usually studded.

Tuberculosis of the Placenta.—The presence of tubercles is rare. It is most frequently associated with acute maternal miliary tuberculosis and should lead one to suspect active tuberculosis of the fetus. Congenital tuberculosis may be acquired in any one of three ways:

1. The tubercle bacilli may enter the ovum with the fertilizing sperm either attached to the surface or actually within the male germ cell.
2. The tubercle may be lodged within the ovum which is later fertilized.
3. The tubercle may have been attached to either the ovum or the sperm and may gain access to the latter after fertilization.

The term "primary congenital tuberculosis" should be reserved for those cases in which no foci of tuberculous infection are present elsewhere in the body.

Primary Pelvic Tuberculosis.—This infection is rare. Its presence is difficult to prove unless an autopsy is performed, for the original focus may be small, quiescent and not recognizable unless a histologic examination of all suspected areas is made.

Primary infection is sometimes referred to as ascending infection, and hematogenous and other varieties as descending types. Tubercle bacilli may gain access to the female genital tract in one of four ways.

1. By direct infection from without, in the tubercle-bearing sperm.
2. From lungs to hand to douche nozzle. This is called primary secondary infection.
3. By infection from neighboring foci (peritoneum, intestines, mesentery glands). Disease is conveyed to the genital tract by way of the lymphatics, usually from a nearby focus.
4. By infection through the blood stream. This is the most frequent route.

This is the only case ever recorded at this hospital of pelvic tuberculosis associated with pregnancy.

SUMMARY

The author reports a rather rare case in which abortion was due to pelvic tu-

berculosis. Tuberculosis of the ovary, the endometrium, the fallopian tubes and the placenta are discussed and the mechanisms of infection described.

ZUSAMMENFASSUNG

Der Verfasser berichtet einen ziemlich seltenen Fall einer durch Tuberkulose des Beckens verursachten Fehlgeburt. Er bespricht die Tuberkulose der Eierstöcke, des Endometriums, der Eileiter und der Plazenta und bescreibt den Infektionsmechanismus.

RÉSUMÈ

La tuberculose du bassin a causè un avortement. C'était une tuberculose de l'ovarie, de l'endométre, de la trompe et du placenta. L'auteur en énumére la pathogéne et le mécanisme.

RESUMEN

El autor comunica un caso muy raro ne el cual se debió un aborto a una tuberculosis pélvica. Se discuten la tuberculosis del ovario, endometrio, trompas de Falopio y placenta. Se describen los mecanismos de infección

RESUMÉ

O autêr descreve um raríssimo caso de tuberculose pelvica

A tuberculose dos ovarios, do endometrio, das trompas e da placenta são estudadas, sendo detalhados ainda os mecanismos de tais infecções.

RIASSUNTO

L'Autore riferisce un caso abbastanza insolito di aborto da tubercolosi pelvica. Tratta, poi, della tubercolosi dell'ovaio, dell'ondometrio, delle tube e della placenta e del suo meccanismo patogenetico.

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Acute Cholecystitis: Optimum Time for Surgical Intervention, Based on the Physiopathologic Picture

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THE history of surgery of the gallbladder is almost a cross section of the history of modern surgery in general. With improvement in technic, anesthesia and equipment, cholecystic surgery became more courageous and comprehensive. Cholecystectomy has practically replaced cholecystostomy,[1] the latter procedure being utilized only as a life-saving measure for "poor risk" patients with empyema of the gallbladder.

The concept of surgical treatment of the gallbladder changed further with the accumulation of experience and clinical data and the increasing knowledge of the physiopathologic character of the disease. Careful analysis of large series of cases at many large hospitals[2] has shown that considerable reduction of the mortality and morbidity rates has been achieved by the change from late or interval cholecystectomy to early cholecystectomy.

Although early surgical intervention in acute cholecystitis has been widely adopted, the subject still provokes controversial discussion at many panels and symposiums.[3] The present-day debate on the subject seems to center about the question, what constitutes early surgical intervention? It has occurred to me, therefore, that a review of the physiologic nature of the gallbladder, both normal and diseased, and of the acutely obstructed gallbladder may provide a firm basis for logical and unanimous opinion as to the optimum time for surgical intervention in acute disease of the gallbladder.

The onset of acute cholecystitis is usually brought about by a stone from the fundus lodging in and obstructing the cystic duct and causing the retention of bile and gallbladder secretions.[4] The ensuing chain of events depends upon the severity of the impaction. The retention of bile and secretions in the bladder chemically irritates the mucosa and produces a chemical inflammatory reaction in the wall. Infection plays little or no part in this phase of the process. The next phase is one of impaired circulation, with inflammatory edema of the wall and duct progressively compressing the cystic vessels; first, compression of veins with consequent increased engorgement and congestion of the bladder, and finally, arterial obstruction with ultimate gangrene. Until there is actual necrosis, the process is to a variable degree reversible. Bacteria may invade the retained secretions or the ischemic wall and cause suppuration. The neglected gangrenous gallbladder must ultimately rupture, resulting in abscess, fistula or peritonitis.

The close neural relation between the stomach and the gallbladder is well known, and there is consistent sympathetic reaction in one because of abnormal irritation of the other. Ingestion of food induces contraction of the gallbladder,[4] and biliary dyskinesia notoriously produces pylorospasm. Nausea and vomiting are common in patients with acute cholecystitis, and frequently a vicious cycle is created when the vomiting increases the reaction of the inflamed gallbladder.

Resolution of the inflammation may be expected in the vast majority of cases if the obstruction to the cystic duct is relieved, since, short of actual necrosis, the inflammatory process is more or less reversible and regenerative. In addition to

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the actual disease of the gallbladder there have been dehydration and loss of electrolytes due to fever and vomiting, but with water and electrolytes replaced all the symptoms may subside completely. However, it is during or after this period of apparent remission and resolution of the condition that there remains a possible great danger if actual necrosis has already developed. Exacerbation of the inflammatory process by reactivating the gallgladder through resumption of diet or recurrence of the obstruction to the cystic duct may well "blow out" a zone of necrosis, with such consequent complications as peritonitis, abscess or fistula. On the other hand, evidence indicates that gangrene rarely develops within forty-eight hours after the onset of acute obstruction of the gallbladder, and perforations occur even later.[7]

From this outline of the pathologic process of acute cholecystitis one may arrive at an idea of the optimum time for cholecystectomy — that is, after rehydration and replacement of lost electrolytes, restoration of liver glycogen, adequate rest by gastric suction and sedation, as well as administration of proper antibiotics.[8] *Early operation does not mean emergency operation*; one may carry out a proper and adequate preparation. The few hours to few days spent with these measures frequently converts a doubtful or even poor risk to a reasonably safe one. Delay longer than that required for good preparation is not necessary and risks complications that increase morbidity and mortality.

According to Heuer,[5] approximately 20 per cent of the Cincinnati General and New York Hospital series of patients with acute cholecystitis had gangrene and perforation of the gallbladder at operation, and these complications contributed greatly to the mortality. In his collection of the experiences of 14 authors reporting over 500 cases of perforation, the mortality rate varied between 15 and 65 per cent, averaging 46 per cent. Glenn[6] reviewed the cases of 586 patients with acute cholecystitis at the New York Hospital from 1932 to 1947. There were 17 deaths, a mortality rate of 2.8 per cent. The reports of Fallis and McClure on cases at the Henry Ford Hospital and those of Smith[2a] on cases at the New York Presbyterian Hospital both reveal the great increase in mortality when the complication of perforation occurs. Avoiding that complication in itself is sufficient justification for early operation.

SUMMARY AND CONCLUSIONS

1. The question of what is meant by early surgical intervention in acute cholecystitis is still controversial.

2. The physiopathologic background of acute cholecystitis is reasonably clear and provides a basis for deciding an optimum time for surgical intervention.

In conclusion, after consideration of the pathologic process of acute cholecystitis, one finds the optimum time for surgical intervention to be after the patient has been rehydrated and the electrolyte balance, plasma and blood cells have been restored, but before necrosis of the gallbladder has progressed to the point of perforation and the associated complications. One may be limited to cholecystostomy for the "poor risk" patients with suppuration who cannot be better prepared for cholecystectomy.[7]

ZUSAMMENFASSUNG

1. Die Beantwortung der Frage, was man in Fällen von akuter Gallenblasenentzündung unter einem frühzeitigen chirurgischen Eingriff versteht, ist noch immer umstritten.

2. Die physiopathologischen Grundlagen der akuten Gallenblasenentzündung sind ziemlich klar und bilden eine Basis für die Wahl des günstigsten Zeitpunktes für den chirurgischen Eingriff.

Unter Berücksichtigung der pathologischen Vorgänge bie der akuten Gallenblasenentzündung wird der Schluss [illegible]ogen, dass der günstigste Zeitpu
Operation eingetreten ist, nachde

seits ein normaler Wasserhaushalt des Kranken wiederhergestellt, sein Elektrolyten-Gleichgewicht ausbalanziert und Blutplasma und Blutzellen ersetzt worden sind, und bevor andrerseits die Nekrose der Gallenblase das Stadium der Perforation mit den damit verbundenen Komplikationen erreicht hat. In eitrigen Fällen, die ein schlechtes Risiko darstellen und eine gründliche Vorbereitung zur Resektion der Gallenblase nicht abwarten können, mag die Anlegung einer Gallenblasenfistel der einzige Ausweg sein.

SUMARIO

1. Continua sendo um problêma muito discutido a questão do que se consegue com uma intervenção cirúrgica imediata nos casos de colecistite aguda.

2. O quadro fisiopatologico da colecistite aguda é satisfatoriamente claro, e esclarece a base para que decida a ocasião ideal para se proceder a intervenção cirúrgica.

Concluindo, após considerar todo o processo patologico da colecistite aguda, chega o autôr a convicção de que o tempo ideal para a intervenção será aquêle verificado após ter sido o paciente convenientemente re-hidratado, quando o equilibrio electrolitico, e o quadro hematico estiverem normalizades, porém antes que haja progredido um processo de necrose da vesicula que possa acarretar perfuração ou outras complicações associadas. A colecistostomia poderá sêr aconselhada para os pacientes com supuração e que não tenham sido melhor preparados para a colecistectomia.

RESUMEN

1. La pregunta de que es lo que significa una intervención quirúrgica temprana en la colecistítis agúda es aún materia de controversia.

2. El fondo fisiopatológico de la colecistítis agúda es razonablemente claro y provee una base para decidir un tiempo óptimo para la intervención quirúrgica.

En conclusión, después de considerar el proceso patológico de la colecistítis agúda, se encuentra un tiempo óptimo para intervención quirúrgica después de que el paciente ha sido rehidratado y se ha restaurado el balance electrolitico, plasma y células sanguíneas, pero antes de que la necrosis de la vesícula haya progresado al punto de perforación con las complicaciones asociadas. Uno puede limitarse a la colecistostomía para el paciente en malas condiciones y pacientes con supuración que no hayan sido preparados mejormente para colecistectomía.

RIASSUNTO

1. Ancora si discute su cosa si deve intendere per intervento precoce nella colecistite acuta.

2. Il substrato fisiopatologico della colecistite acuta è abbastan za chiaro e fornisce gli elementi per decidere quale sia i momento opportuno per l'intervento. A conclusione dello studio sull'andamento anatomopatologico dell'affezione si può dire che l'intervento deve essere eseguito dopo che il paziente sia stato reidratato e rimesso in bilancia per quanto riguarda elettroliti, plasma e sangue, ma prima che la necrosi della parete sia giunta fino a determinare perforazione della colecisti o altre complicazioni. Ci si può attenere alla semplice colecistotomia nei casi gravi con suppurazione e che non sono suscettibili di migliorare col trattamento.

RÉSUMÉ

L'auteur se demande qu'est-ce qu'on entend par un traitement précode de la cholécystite aigue. La pathologie physiologique de cette affection est, il lui semble, tellement évidente qu'il ne doit y avoir aucun doute pour le temps optimum du traitement chirurgical. D'aprés l'auteur, ce temps optimum serait lorsque le patient aurait été hydraté, que ses électrolytes fussent contrôlées, que du sang et du plasma lui auraient été fournis. Mais surtout avant que la nécrose de la vésicule biliaire n'ait aggravé la situation et risffué la vie du patient.

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NINTH INTERNATIONAL CONGRESS, 1954

Under the Sponsorship of the Brazilian Government

Notice to All Members of the International College of Surgeons:

The House of Delegates on May 9, 1952, in Madrid, Spain, decided that the City of São Paulo would be the meeting place of the next International Congress, approving the suggestion of His Excellency the Governor of the State, Prof. Dr. Lucas Nogueira Garcez. Brazilian members of the Board of Trustees were appointed to the Commission organizing the Congress, under the direc*tion of Prof. Dr. Carlos Gama, Vice-President of the International Congress* and Secretary General for South America.

The Ninth International Congress will be held from April 26 to May 2, 1954. *The official topics are (1) experience with socialized medicine in differ*ent countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the Fourth Centennial of the city of São Paulo, it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commemorative activities of São Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure that the program shall be absolutely functional, all who are interested are requested to write to the address below.

—Prof. Dr. Carlos Gama, Secretaria, Praca Ramos de Azevedo, 7.°
Andar, Sala 710, São Paulo, Brazil.

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Traumatic Rupture of the Renal Vein with Intervention One Month After Accident

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ACCORDING to the literature, traumatic rupture of the renal vein is apparently exceedingly rare. In a collective review of 122 renal surgical cases reported by Cheetham it was indicated that 8 per cent of all renal operations were performed for trauma. In most instances there was either profound damage to the kidney itself, rupture of the renal artery, or rupture of the renal artery and vein together. Loyer[1] in reporting traumatic rupture of the right renal vein, described one of the few cases similar to this one. Levant[2] reported unilateral injury of the renal vein. Details of this case have not been made available. Petta[3] reported total traumatic rupture of the right renal vein and artery.

In the American literature, Edmonds,[4] reported traumatic rupture of the left renal artery without injury to the kidney. This condition was missed at operation because of rupture of the spleen, which commanded the surgeon's immediate attention. Only 15 cases were recorded in the literature prior to 1918, 1 of which was reported by Lincoln.[5] Arteriosclerosis or syphilis, as observed in the older age groups, seems to predispose to such traumas as a result of direct accidents. There was but 1 case noted in the younger age group, a thirteen year old. Atkinson[6] reported a rupture of the renal artery and vein by slight injury, with subsequent operation and recovery, in the *British Medical Journal*. The case here reported likewise fits well into this category, in that the original injury apparently was slight, but in this case only the renal vein was ruptured owing to the trauma. This patient was operated on one month after the history of the original injury and when first seen was in impending surgical shock. She subsequently made a satisfactory recovery.

REPORT OF CASE

The patient, Mrs. E. C., is a white female, married and housewife by occupation. She is thirty-four years of age and weighs about 125 pounds (56.8 Kg.). The patient fortunately was well known to me, and when she telephoned me at about 1 p.m. and asked for something for relief of pain I was aware that her pain threshold and constitution were such that the pain must be rather pronounced before she would seek help. I therefore suggested that if she was not incapacitated she should come in and be examined. No other relevant history emerged from the telephone conversation.

Mrs. C.'s past health had been excellent except for minor gynocologic problems. She had borne a child after a normal pregnancy about one year earlier. There were no complications. She was seen at approximately 3:30 p.m., and palpation of the abdomen revealed a mass in the right lower quadrant, just 3 cm. below the level of the umbilicus. The mass was firm and tender but could not be palpated through the pelvis. The patient, however, made an interesting comment to the effect that she had been having a foul yellowish discharge from the vagina over the past two or three weeks, for which she could not account. The condition of the cervix was well known to me, as nebothian cysts had been removed rather recently. A complete blood count, a urinalysis and a determination of the sedimentation rate were accordingly ordered and the patient was allowed to rest in a small room while these studies were being evaluated. On one of a few visits to the patient during a busy afternoon it was noted that there was a small amount of perspiration on her brow and a rather pale and anxious facies. This was about 5:15 p.m. At this time the patient also was nauseated.

A flat plate of the abdomen likewise had earlier revealed no abnormality except for the

* Received for publication Jan. 2, 195[illegible]

presence of feces, some gas and an undiagnosed outline of the aforedescribed mass. There was no rebound tenderness clinically, but at this later hour the mass had greatly increased in size. The blood pressure in millimeters of mercury, which had been 110 systolic and 70 diastolic when the patient was first seen, at 3:30 p.m., had now dropped to 70 systolic and 40 diastolic. The blood count, which had been taken shortly after 3:30 p.m. showed 88 per cent hemoglobin (15.5 Gm.). The color index was minus 1. There were 4,020,000 red blood cells and 8,800 white blood cells per cubic millimeter, with 53 per cent polymorphonuclears, 1 per cent basophils, 29 per cent large lymphocytes and 17 per cent small lymphocytes. By this time the sedimentation rate, two hours having elapsed, indicated a drop to 35 mm. (Westegren). It was considered that the patient was in impending surgical shock. She was summarily transferred to the hospital, where preparations were made for emergency laparotomy. Up to this time no definite diagnosis other than "surgical abdomen" had been made.

The patient and her husband were questioned again and again in regard to traumas, since I wondered whether some trauma might have occurred which they were not willing to admit. There was, however, no external evidence of any such trauma. After some question, the patient remembered that it was on her pre-Christmas trip to Utah to visit her parents that the pain in her right side first became evident. She gave the date as December 23, 1951; as they were riding along an icy road the car, driven by her husband, skidded off the road into a snowbank. She described having struck the right loin of the arm rest of the car as she turned in an attempt to protect her children as the car went out of control. She likewise described an intermittent feeling of fullness in the right side ever since, the pain evidently involving the right loin. The patient stated that she had been feeling badly since the time of the accident and did not seem to care whether or not she got anything done around her home. The time element, it now being Jan. 22, 1952, minimized the significance of this important history.

On her admission to the hospital the patient's temperature was 97 F., the pulse rate 60 and the respiratory rate 20. The blood pressure was again recorded and was now 40 systolic and 20 diastolic. The mass in the right quadrant seemed to increase over its size when noted and recorded at about 5:15 p.m. Involvement of the uterus and adnexe seemed to be well ruled out clinically, although, for want of a more positive diagnosis, right tubal pregnancy was one of the tentative diagnoses. The menstrual history militated against this consideration. The clinical appearance and condition of the patient, however, indicated hemorrhage, and the location of the mass (slightly below the umbilicus on the right side) was strong evidence that this consideration should not be abandoned. The patient described feeling a "catch" in right side of her back at about 11 a.m., after shaking her floor mop out of doors. This then developed into dull, nagging pain, which became increasingly severe. An interesting comment made by the patient was that she noted that though she had gained no weight since the date of the accident in December, all of her skirts had been tight since about that time. Her last menstrual period had begun on Jan. 14, 1952 and the next to last on Dec. 19, 1951. Both had followed the normal pattern.

Operation was performed at about 8:45 p.m. after typing, and transfusions were well under way. The patient, placed on the operating table with a transfusion going in each arm, had an alarming blood pressure of zero/zero. Prior to the operation she was given a minimum of 500 cc. of whole blood, together with supportive therapy, and further blood was administered during the operation. An incision was made adjacent to the umbilicus and over the mass, with the lower limb of the incision about 10 cm. below the umbilicus and the upper limb about 5 cm. above the umbilicus. The rectus muscle was retracted medially, and the peritoneum was seen to be exceedingly dusky, apparently indicating interperitoneal hemorrhage. To the surprise of the surgeon and his assistants, the hemorrhage proved to be within the right broad ligament, extending over the anterior and posterior aspects of the uterus. It had invaded the head of the cecum, a large part of the ascending colon, and along the distal ileum for about 2½ to 3 feet (76.2 to 93.9 cm.). An incision was made, reflecting the ascending colon medially, and the ureter was identified. The ureter likewise was dusky brown to black throughout its length. It was then followed superiorly to the lower pole of the kidney, where the retroperitoneal clot was considerably more abundant than it was at the lower level, where the retroperitoneal incision originated. Handfuls of clot were scooped out of the retroperitoneal space below the lower pole of the right kidney, and finally marked hemorrhage was brought about by continuous and persistent removal of the mixture of perirenal fat and organized clot material. The bleeding ends of the renal vein were seen and immediately grasped, so that hemorrhage could be arrested.

The vein, which had been torn, seemed to have a lumen about 0.5 cm. in diameter. Two smaller veins were seen above the renal artery, and neither they nor the artery showed any evidence of damage. The kidney itself was of normal size and shape, in good position and of excellent color and texture. After thirty minutes' observation of the organ there seemed to be no good reason to resect it. The cavity was carefully cleaned of residual clot and the perirenal fat with which the clot was mixed, and great care was exercised to be sure hemostasis was entirely secure and satisfactory. The kidney, accordingly, was left *in situ*, and the posterior peritoneal layer was closed. The abdomen was subsequently closed in layers.

The postoperative condition of the patient was considered fair. The operation was completed in about one hour and forty minutes. After the third blood transfusion the patient's blood pressure responded satisfactorily and her general condition improved greatly. She was discharged from the hospital on the twelfth postoperative day, in excellent condition.

Postoperative intravenous pyelograms were taken on March 17. The preliminary film of the abdomen showed the kidney contours. The right kidney was the same size and shape as the left. There were no calcifications in the kidney-ureter-bladder area. Some phleboliths were apparent in the pelvic inlet.

Films were made five, fifteen and twenty minutes after the intravenous injection of Neriopax. Prompt excretion of the dye on both sides was evident in the five-minute film and further excretion in the later films. Attention was directed to the right kidney calyces; some fullness of the infundibula and the renal pelvis was noted, but there was no evidence of obstruction or dilatation of the upper portion of the ureter, which showed slight hydronephrosis. There were no shadows suggestive of anomalous veins. The twenty-minute film was made with the patient erect, and this showed a slight drop of each kidney, more marked on the left. There were small amounts of dye remaining in both kidneys. Most of the dye was in the urinary bladder. The upper portion of the right ureter was best visualized on one of the fifteen-minute films.

The diagnosis was slight hydronephrosis of a satisfactorily functioning right kidney. There were no anomalies of the renal pelvis of the portion of the right ureter and no evidence of renal stones.

On May 15, another postoperative examination was performed. A plain film was made of the urinary tract. Intravenous pyelographic studies were taken at five and fifteen minutes with the patient in the supine position, the latter being steroroentgenograms, and an erect view was also made.

Both kidneys were of average size, shape and position. There were no densities along the course of the urinary tract that could be identified as calculi. There was evidence of early hydronephrosis involving the right kidney. The most recent earlier films were not available for comparison but, according to the report made March 17, there was apparently no essential change in the degree of hydronephrosis since that time. The right ureter was fairly well visualized; the upper half was moderately dilated. The cause of this dilation was not roentgenographically evident. The lower half of the ureter was within normal limits, as were the pelves and calyces of the left kidney. The left ureter was quite well visualized and was of normal caliber.

In the erect position the descent of the kidneys was within normal limits, and there was fairly good emptying of the right kidney.

The final diagnosis was early hydronephrosis involving the right kidney, with the descent of the kidneys within the normal limits and no roentgen evidence of a urinary calculus.

COMMENT

One of the points interesting to note in retrospect was the patient's simple but very important comment that she had noted her waistline becoming fuller since the date of the accident in December. Another valuable consideration that was overlooked was the interesting type of discharge which the patient so ably described and to which I did not attach any particular significance, since the condition of the cervix and the vagina was known to have been entirely normal at a recent date. It reminds one of the sputum of patients with passive congestion of the lung during chronic heart disease. There were no notable urinary abnormalities. The hemoglobin level dropped to 61 per cent at about 6:30 in the evening, and the total white cell count was 18,000 per cubic millimeter of blood. The total red blood cell count at this time was 3,960,000 per cubic millimeter.

It is well to be aware that such a slight accident as is described here and caused by an arm rest might precipitate complete tearing of a renal vein. One considers an arm rest so well padded that this seems far-fetched, if not impossible. If the mass had developed directly below the kidney instead of pointing in the anterior abdominal wall below the umbilicus, the preoperative diagnosis might have been more positive. It was interesting to note the progress of the blood insinuating itself between the retroperitoneal folds and along the course of the bowel, the broad ligament, the ureter and the uterus. This undoubtedly was a slow and gradual process, and the patient must have suffered a good deal of discomfort for the full month during which this progress was taking place.

SUMMARY

An unusual trauma of the right renal vein, with total separation of the vessel, is reported. There was unusual progress of the blood in a retroperitoneal direction, leading finally to the interesting commotion which caused sufficient hemorrhage to warrant the patient's asking for relief of pain. To our knowledge, this is the first case in which so long a time elapsed from the onset of the original trauma to the time of operation. The condition was not recognized until laparotomy was performed. Postoperative progress was very satisfactory, indicated by roentgenograms taken as late as May 15, 1952.

RESUMEN

Se comunica un caso raro de traumatismo de la vena renal derecha con desprendimiento completo del vaso. Se encontró una propagacíon rara de la sangre en dirección retroperitoneal, dando lugar a una conmoción interesante que causó suficiente hemorragia para garantizar la petición del paciente de algo para calmar su dolor. A nuestro conocimiento, este es el primer caso en el cual ha transcurrido un tiempo tan largo entre el comienzo del trauma y el tiempo de la operación. Dicho proceso no fué reconocido hasta que se hizo la laparotomía. El curso postoperatorio fué muy satisfactorio, indicado por los roentgenogramas tomados hasta Mayo 15 de 1952.

RIASSUNTO

Viene riferito il caso di un insolito trauma della vena renale destra con sezione totale di essa. Il sangue si diffuse, contrariamente a quanto avviene di solito, verso il retroperitoneo e determinò alla fine un quadro tale da decidere il paziente a richiedere intervento per il dolore che provava. A quanto ne sappioma questa è la prima volta in cui tanto tempo è trascorso fra il trauma e l'operazione. La lesione non fu diagnosticata che intraoperatoriamente; il decorso successivo fu buono e la guarigione confermata da un recente esame radiologico.

ZUSAMMENFASSUNG

Es wird über eine ungewöhnliche mit völliger Abtrennung des Gefässes einhergehende Verletzung der rechten Nierenvene berichtet. Es erfolgte ein merkwürdiges Abfliessen des Blutes in Richtung auf den retroperitonealen Raum, was schliesslich zu einem interessanten Unruhe Zustand führte. Dieser verursachte eine Blutung, die umfangreich genug war, um den Kranken wegen seiner Schmerzen ärztliche Hilfe suchen zu lassen. Dem Verfasser ist kein anderer Fall bekannt, in dem die Zeitspanne zwischen der ursprünglichen Verletzung und der Operation so gross war wie im vorliegenden. Die Diagnose wurde erst bei der Laparrotomie gestellt. Der Krankheitsverlauf nach der Operation war sehr befriedigend, wie durch Roentgenuntersuchungen vom 15. Mai 1952 bestätigt wird.

RÉSUMÉ

L'auteur rapporte un cas de traumatisme de la veine rénale droite où il y eut séparation complète des vaisseaux. Le sang ayant envahi l'espace rétro-péritonéal il se fit une hémorragie assez importante pour causer de la douleur considérable au patient. Cas rare, où le diagnostic ne se fit qu'à l'intervention.

SUMARIO

E registrada uma lesão pouco comum da vêia renal direita, no qual havia a progressão do sangue para a região retro-peritoneal, causando uma hemorragia pronunciada que obrigou ao doente a solicitar um alivio urgente para as dôres que apresentava. Segundo o autôr, é este o primeiro caso em que houve tanta demora entre o traumatismo original e o momento exato em que se processou a intervenção, sendo que a lesão não foi diagnosticada, sinão após a laparotomia praticada, aliás com absoluto sucesso, num posoperatório muito satisfatório.

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Editorial

Constitutional Arterial Variations

as Exemplified in the Blood Supply of the Liver

The surgeon's need of dealing with the blood vessels is a criterion of his proficiency in his art. The moment of tying the ligature is, indeed, a dramatic one. The monstrous, booming tumor is stilled by a tiny thread, the trumpet silenced by the magic wand.

William Stewart Halsted (1921)

One of the chief fascinations of surgery is the management of wounded vessels, the avoidance of hemorrhage. The only weapon with which the unconscious patient can immediately retaliate upon the incompetent surgeon is hemorrhage. If he bleeds to death, it may be presumed that the surgeon is to blame, whereas if he dies of infection, or shock, or from an unphysiological operative performance, the surgeon's incompetence may not be so evident.

William Stewart Halsted (1912)

NO more appropriate caption could be chosen for the present contribution than the cited passages from the writings of William Stewart Halsted, whose centenary of birth was celebrated last year. Born in 1852, he was one of the greatest of the pioneer surgeons of America. It was he who, whilst at Johns Hopkins University Hospital, introduced the use of rubber gloves in surgery in 1893 and thus made possible the modern glorious extension of antiseptic operative surgery.

Cognizant of the fact that with a wide basic knowledge of anatomy and embryology, both normal and morbid, a surgeon is never lost when operating; Halsted spent years of his life in a serious and vigorous campaign educating prospective surgeons to keep abreast with anatomy and, in particular, to have a healthy respect for life-sustaining arteries when operating. Very effectively, by admonition and example, Halsted left an everlasting message to surgeons, namely, that the best way to avoid injury to blood vessels is to know them and know how, when and where to ligate them properly.

In these days, when the teaching of anatomy has been severely curtailed in the medical curriculum and to a large extent has been estranged from all but the purely surgical aspect of medicine, it is well to recall the fact that William Harvey (1578-1657), the great physiologist and discoverer of the circulation, entitled his immortal work in 1628 "An Anatomical Dissertation on the Movement of the Heart and Blood." He did not describe it as a "physiological dissertation," for he felt that "Not from books but from dissection, not from the tenets of philosophers but from the structure of Nature do I profess to learn and teach anatomy."

In this attitude he acted like Andreas Vesalius (1514-1564) the fifth in an unbroken line of doctors and the father of modern anatomy. Years after his successful overthrow of the Galen School of Anatomy, Vesalius stated: "My study of anatomy would never have succeeded had I, when working at medicine at Paris, been willing that the viscera should be merely shown to me and to my fellow-students at one or another public dissection by wholly nonskilled barbers, and that in the superficial way. I had to put my own hand to the business."

After his premedical studies at Brussels and Louvain, Vesalius entered medicine at Paris in his nineteenth year, but after three years of anatomic dissection there, he returned in 1536 to Louvain University, his Alma Mater, where he continued to study anatomy by dissection. From Lou-

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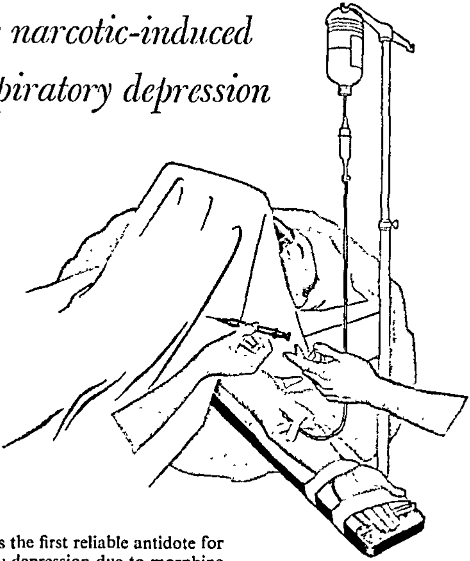

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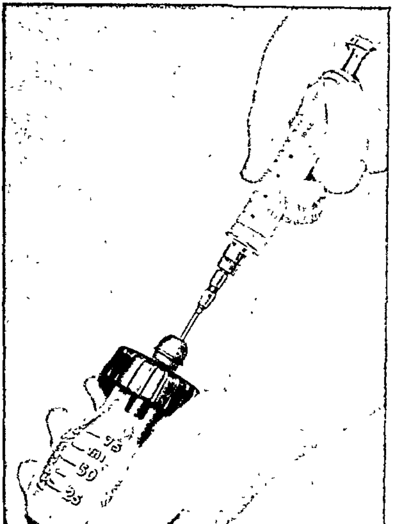

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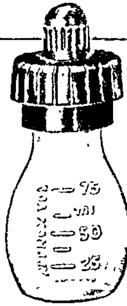

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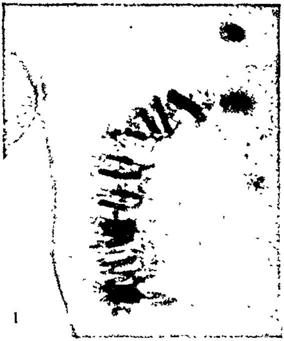

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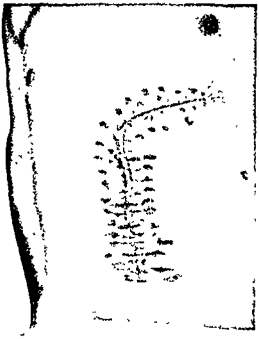

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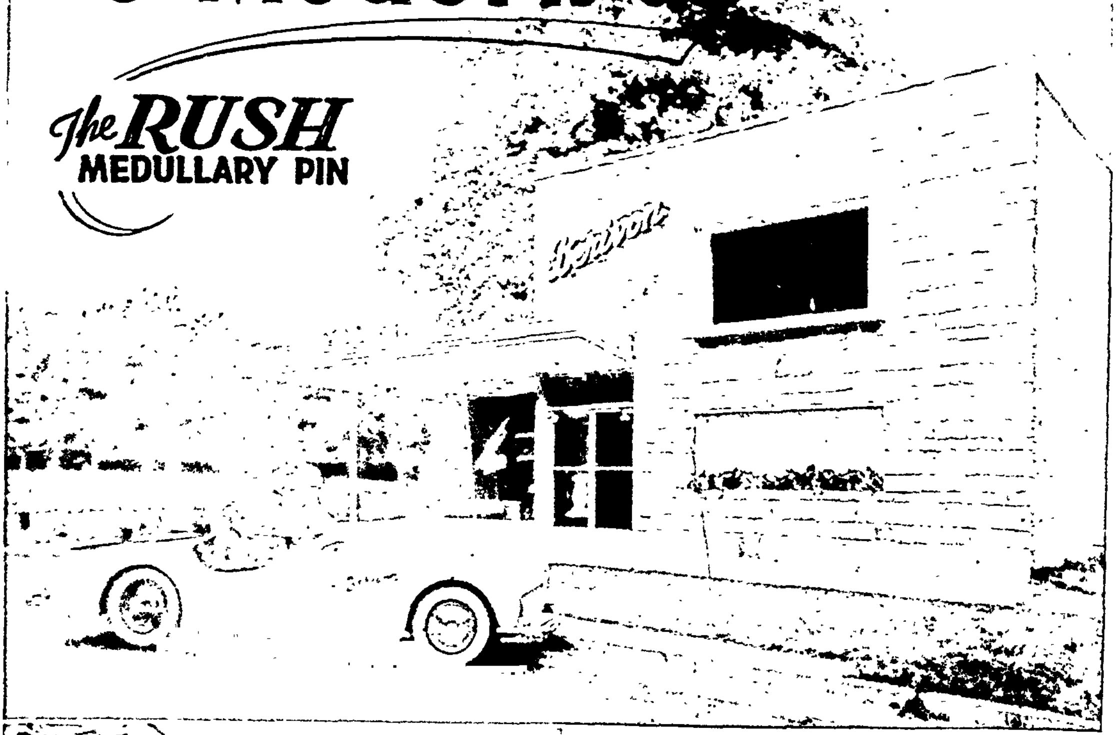

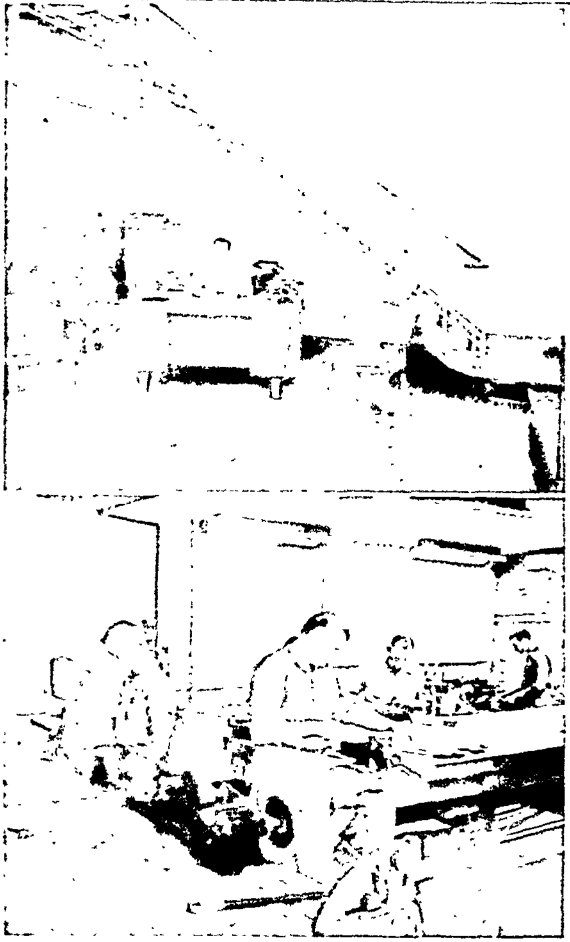

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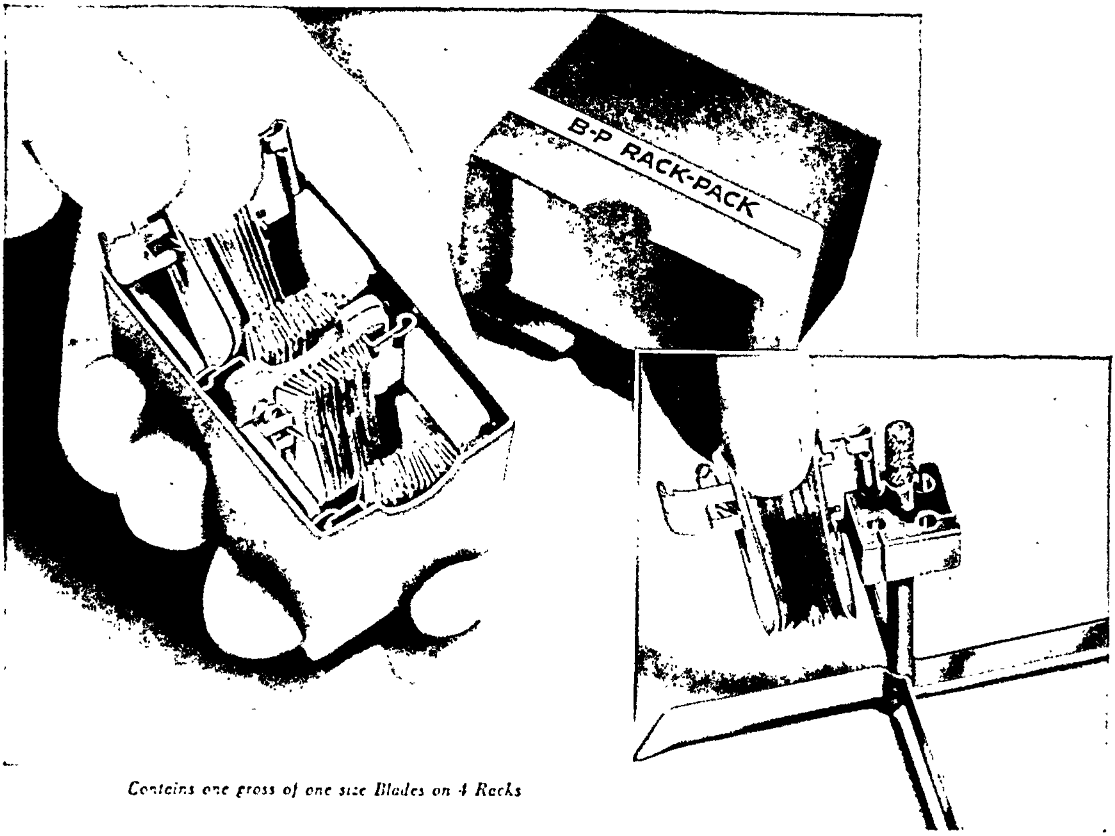

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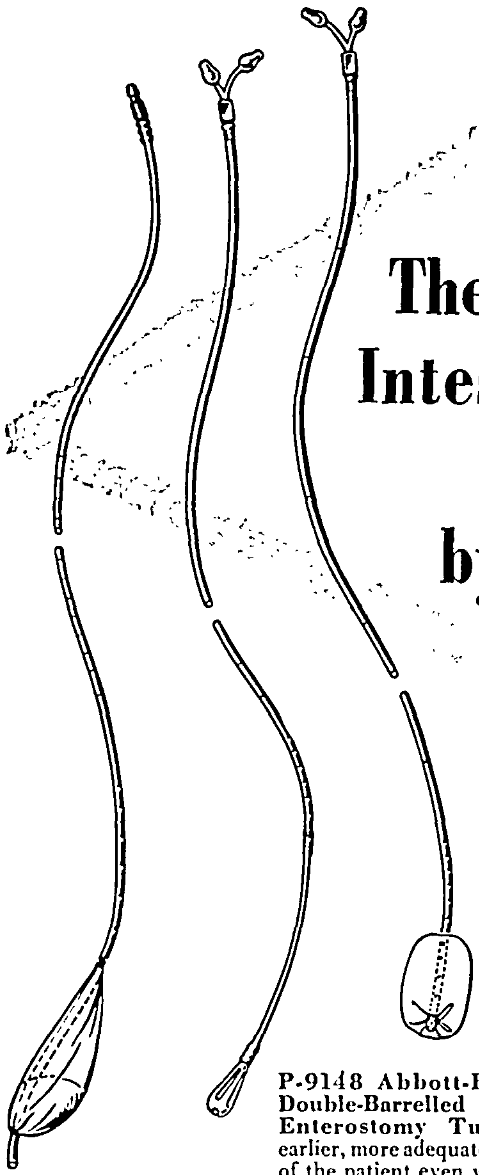

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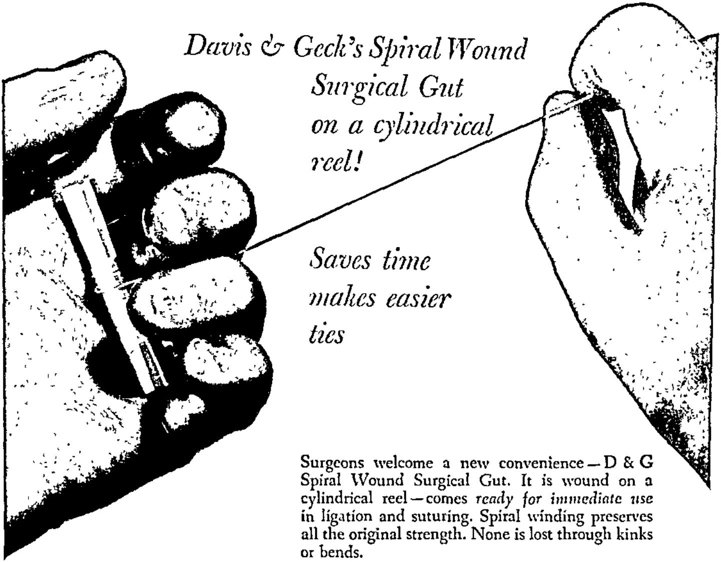

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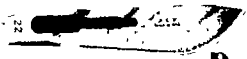

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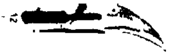

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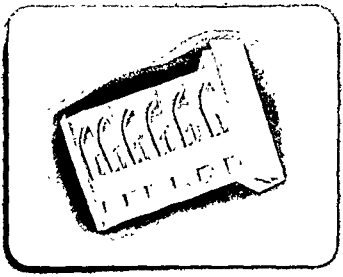

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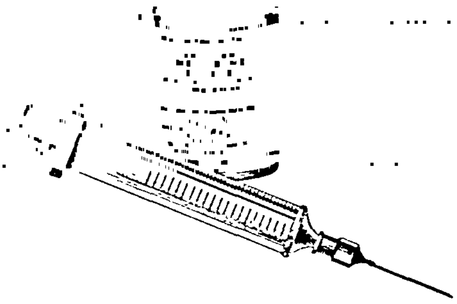

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Vol. XX JULY, 1953 No. 1

Original Articles

Multivalvular Heart Disease and Simultaneous Surgical Correction

HOUCK E. BOLTON, M.D., C. P. BAILEY, M.D., F.A.C.S., F.I.C.S.
WILLIAM L. JAMISON, M.D., AND K. V. S. RAO, M.D.
PHILADELPHIA, PENNSYLVANIA

CARDIAC surgery has progressed at a phenomenal pace in the past few years. As surgeons' experience has broadened, so has their latitude of technical capability.

In the earlier period, efforts were restricted toward the correction of a lesion of one valve—the stenotic mitral valvular deformity resulting from rheumatic fever. As the technic became more refined and reliable, attention was naturally turned to regurgitant lesions of the mitral valve and to the aortic valve, the next most commonly diseased valve (Tables 1 and 2).

TABLE 1.—*Relative Frequency of Valvular Lesions Observed at Autopsy in Three Diversified Centers*

	New England Cabot 208 Cases	Vienna Kaufman 126 Cases	Berlin Sperling 300 Cases
Mitral	85.6%	60%	85% (C)→ 52% (P)
Aortic	14.7%	76%	43% (C)→ 13% (P)
Tricuspid	15.9%	25%	10% (C)→ 1% (P)
Pulmonary	1.9%	0	1% (C)→ 0
Aortic & mitral	19.2%		
Aortic & mitral & tricuspid	11. %		

5% showed other varying combinations

TABLE 2.—*Relative Frequency of Cardiac Valvular Lesions Diagnosed Clinically*

	New England Series (White) 1,097	John Hopkins 1,781
Pure mitral	56.3%	51%
Aortic	14.7%	
Aortic & mitral	28.9%	

From the Department of Thoracic Surgery, Hahnemann Medical College and Hahnemann Hospital, Philadelphia, and the C. P. Bailey Thoracic Clinic, Philadelphia.

Read at the Regional meeting of the International College of Surgeons, Philadelphia, Feb 14, 1953.

Submitted for publication April 21, 1953.

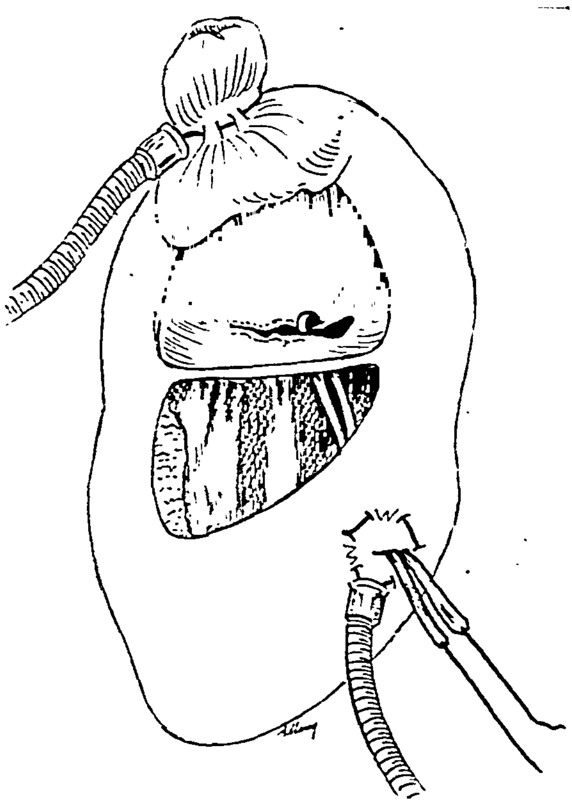

Fig. 1.—Single suspension of septal leaflet of mitral valve.

The earlier approaches to the relief of aortic stenosis were most frustrating and disappointing.[1] Attempts at aortic commissurotomy have been made in a variety of ways. At this time we have a method of relieving aortic stenosis which we find very satisfactory.

With the treatment of aortic stenosis, mitral stenosis and mitral regurgitation well established, the natural evolution was to consider simultaneous operations on the patients with multivalvular heart disease.

Our purpose here is to present the results of our experience with simultaneous surgical treatment of the affected valves.

Mitral Valvular Surgical Procedures.—Mitral commissurotomy is a procedure so familiar to all surgeons that we need not dwell upon it at length. Suffice it to say that our approach to the mitral valve with the right index finger is through the left auricular appendage. After exploration of the valve, the anterior, the posterior or both commissures may be separated by simple digital pressure in the direction of the commissure. By this method one-third to one-half of the operations may be handled. In the other half it is usually necessary to use the guillotine commissurotomy knife.

The usual degree of stenosis encountered is such as scarcely to admit the tip of the index finger—about the diameter of a cigarette, at a rough estimate. Our objective is to enlarge the valve to as nearly normal size as possible; that is, to a size that will admit two fingers. Occasionally it is necessary to be satisfied with something less than the ideal opening, because of the appearance of a small amount of regurgitation during the commissurotomy.

TABLE 3.—*Multivalvular Lesions Treated Concomitantly by Authors, as Compared with Isolated Lesions*

Mitral valvular lesions	843
Aortic stenosis (new instrument)	56
Aortic stenosis (previous instrument)	18
	74

Of the 74 aortic lesions, there were 28 cases with associated mitral valvular lesions treated concomitantly.

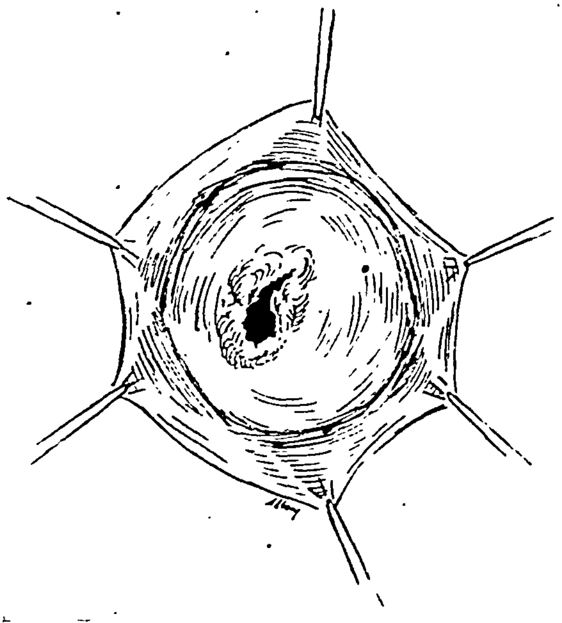

Fig. 2.—"teardrop" shape of valve orifice.

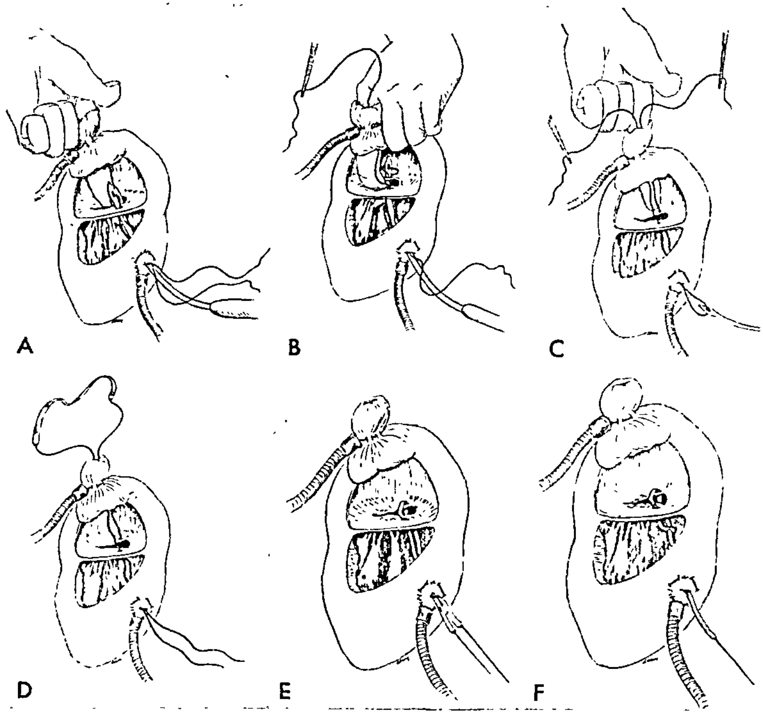

Fig. 3.—Diagrammatic demonstration of steps (*A, B, C, D, E, F,*) in valvular suture or mitral commissurorrhaphy.

Because of the exhaustive literature on the subject, we prefer not to elaborate on this technic of mitral commissurotomy. We have, drawn our conclusions from over 843 cases of mitral valvular disease in which operation has been performed by us (Table 3).

Mitral Commissurorrhaphy or Valvular Suturing.—Mitral insufficiency has been treated in a variety of ways. In our first attempts we placed a "sling" made of a roll of pericardium across and beneath the mitral valve to be forced into the incompetent valvular orifice during ventricular systole. This created a tamponage effect.[2] This procedure has been abandoned in favor of a technic of suturing the mitral leaflets together or suspending the aortic or septal leaflet of the mitral valve singly[3] (Fig. 1).

The contour of the usual incompetent valve is that of a teardrop. The anterior commissure represents the small end of the teardrop and the poosterior commissure its bulbous end (Fig. 2).

Mitral commissurorrhaphy consists essentially of two procedures: the first, suture of either an everted vein or a narrow strip of pericardium is caused to pass through the wall of the left ventricle. It then passes through the more posterior aspect of the septal leaflet and back through the mural mitral valvular leaflet until the opposite end protrudes through the wall of the left ventricle. A perforation in one end of this suture serves as an "eye" into which to insert the opposite free end. Traction is then applied, resulting in a "noose" which tightens and approximates the edges of the valve in the posterior aspect (Fig. 3).

The second technic consists of passing the same type of suture through the ventricular wall, through the septal valvular leaflet and back out through the ventricular wall. This has the effect of a double or inverted U — "chordae tendinae" — to pull the septal leaflet downward and laterally (Fig. 4). This results in deflection of the flow of blood in such a fashion as to direct it out of the atrium during ventricular diastole, as well as to approximate the edges of the leaflets during ventricular systole.

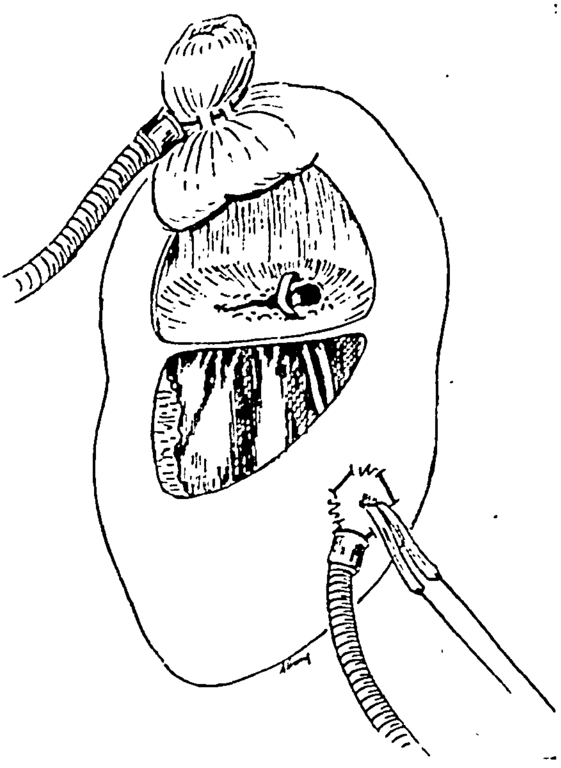

Fig. 4.—"Chordae tendinae" effect of suspension of the septal leaflet (see Fig. 3C).

By this technic we are able to diminish the quantity of regurgitation appreciably. These methods are by far the most satisfactory existing for the treatment of mitral insufficiency at present.

Combined Mitral Commissurotomy and Commissurorrhaphy.—In a large number of cases of mitral valvular disease, mitral senosis and mitral insufficiency are combined. In such instances the commissurotomy is done first. The regurgitation may diminish, owing to this valvular mobilization, to such a point that valvular suturing is not necessary. This is determined by palpating the regurgitant jet which strikes the finger in the left atrium during each ventricular systole. In our estimation, 12 to 15 cc. per heartbeat is the upper limit of regurgitation that can readily be tolerated.

Ordinarily, when necessary, the valvular suturing is carried out after commissurotomy.

Technic of Aortic Commissurotomy.—The earlier attempts at aortic commissurotomy consisted of inserting a dilator through the wall of the left ventricle and advancing the instrument to the level of the aortic valvular ring. The dilator was then expanded in order to dilate the valvular orifice. The dilating mechanism was one which expanded in an elliptic form. By virtue of the ellipse, there was a tendency for the dilated portion to slip out of the valvular orifice, which resulted in an inadequate dilation. This instrument was abandoned when the present Bailey[16] aortic dilator was developed. This instrument has proven to be very satisfactory for aortic valvular dilatation.

This instrument* (Fig. 5 a,b), is a curved shaft with an end that expands to an adjustable degree. The expanding

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*Available through George Pilling & Sons, Philadelphia Pa.

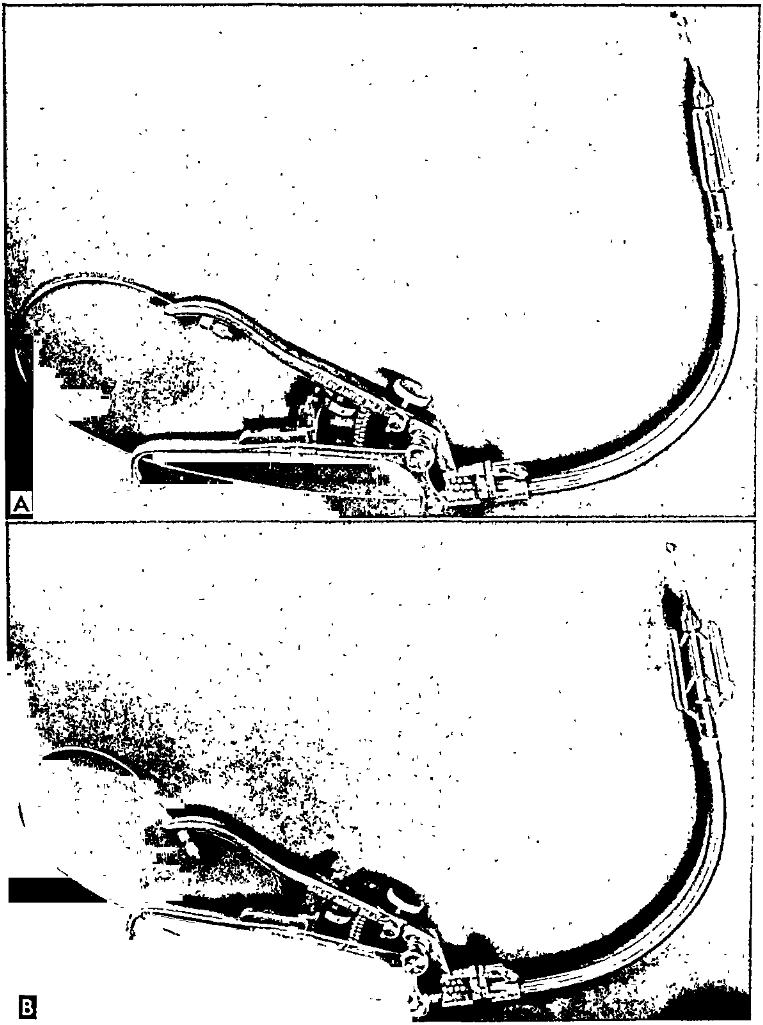

Fig. 5.—Aortic dilator (*A*) with dilating mechanism closed; aortic dilator (*B*) with dilating mechanism expanded.

end has three bars, which are wedge-shaped and parallel to a swiveled central shaft. This swivel mechanism allows the bars to expand and adjust themselves to the commissures of the valve cusps; thus accurate separation of the commissures can be accomplished without injury to the cusps (Fig. 6, *A*, *B* and *C*).

The treatment of aortic stenosis is carried out with the patient in the lateral position, and a left parascapsular incision is used, the left hemithorax being entered through the fifth intercostal space. A lateral is preferred to an anterior approach in order that the left auricular appendage may be accessible for exploration of the mitral valve if there is the slightest question as to the presence of such a mitral valvular defect. The mitral valve is explored if there has been suspicion of the presence of disease based on the results of physical examination or other preoperative evidence. As soon as the pericardium is opened, the heart is examined for the presence and location of palpable thrills. If there is no systolic thrill over the left atrium and no diastolic thrill over the left ventricle, the mitral valve is not explored.

Order of Treatment of Combined Lesions of the Mitral and Aortic Valves.—When there is coexisting mitral valvular and aortic valvular disease, the problem of which lesion should be treated first is baffling. If there is mitral obstruction present and this is relieved, the persistence of aortic obstruction will probably result in left ventricular engorgement if the aortic obstruction is not relieved in short order. Occasionally, after the mitral procedure is carried out, a serious drop in blood pressure may ensue, and it then becomes necessary to close the chest as rapidly as possible and turn the patient on his back. Usually, with supportive measures performed by the anesthetist, the hypotension is then relieved. This, of course, requires a difficult decision: whether the patient can stand reopening of the hemithorax for aortic commissurotomy.

On one occasion we have waited for thirty minutes after closure of the parascapular or posterolateral incision and then proceeded by leaving the patient in the supine position, reopening and extending the incision anteriorly and carrying out the aortic valvular procedure. The result was excellent.

In general we have elected to do the mitral operation first, followed by the aortic. If one's experience in the treatment of aortic stenosis is somewhat limited, it might be wise to perform the aortic commissurotomy first. Then, if it becomes necessary to abandon further operation at this time, the mitral procedure can be performed at a later date.

The decision as to which valve is to be operated on first, then, depends upon the experience of the operator and the rapidity with which he can carry out the second (valvular) procedure.

In considering the surgical correction of mitral stenosis coexistent with aortic stenosis, one may have to decide to treat only one valve. In such a case the aortic valve should be treated.

The necessity of having to operate on the two valves concomitantly has not altered the technic in either case.

Protection of the Brain.—Cerebral embolization has been one of the major problems in performing mitral and aortic valvular surgical procedures. The frequency of appearance of thrombi in the left auricular appendage, as well as calcific deposits on either or both mitral and aortic valves, necessitated a technic for protection against embolization of the cerebral vessels. Our method of brain protection is simultaneous occlusion of the left common carotid artery and the innominate artery at critical moments.[4]

Technic.—After the left side of the chest has been opened, the apex of the lung is retracted downward. The mediastinal pleura is incised above the aortic arch, between the vagus and the phrenic nerves. Sharp and blunt dissection is used to expose the left common carotid and innominate arteries. A strip of umbilical tape is

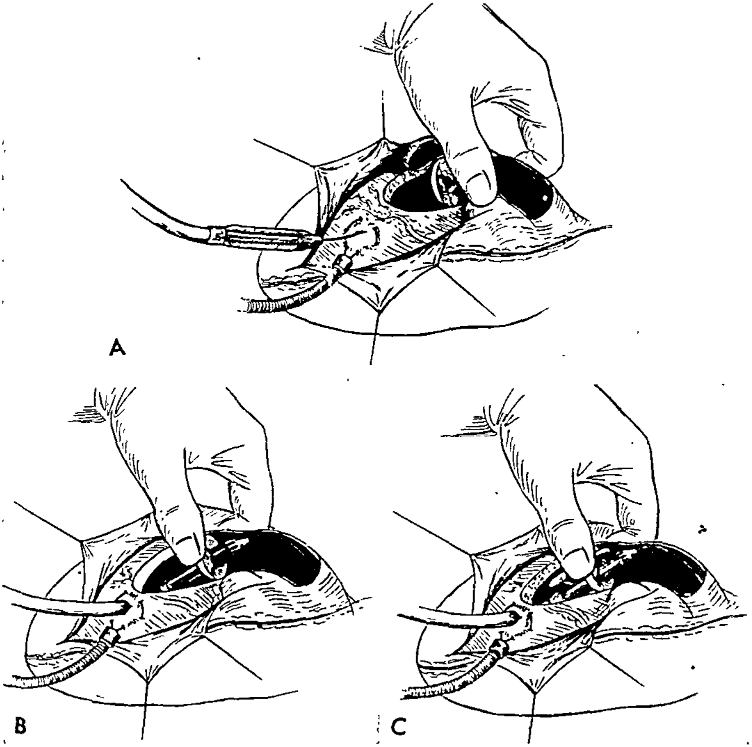

Fig. 6.—Guide wire of the dilator inserted through the ventricular wall (*A*) and advanced into the aorta by palpatory guidance with the left hand; *B*, dilating mechanism in position in arotic valve; *C*, dilating mechanism expanded in stenotic aortic valve.

passed around each of the two vessels (Fig. 7). A Rumel tourniquet is used to occlude the innominate artery, and simple traction on the other tape is used to kink and occlude the left common carotid artery. This is done at any time the appendage, the mitral valves or the aortic valves are manipulated in any fashion.

The time during which the vessels may be safely occluded is considered to be ninety seconds, with an equivalent time allowed for reestablishing cerebral circulation (that is ceasing all surgical maneuvers leaving the vessels open). The greatest length of time we have found employed for occlusion of these vessels was three minutes. This was occasioned by a [illegible] circumstance, when we were [illegible] a particularly difficult thrombus ricular appendage. There

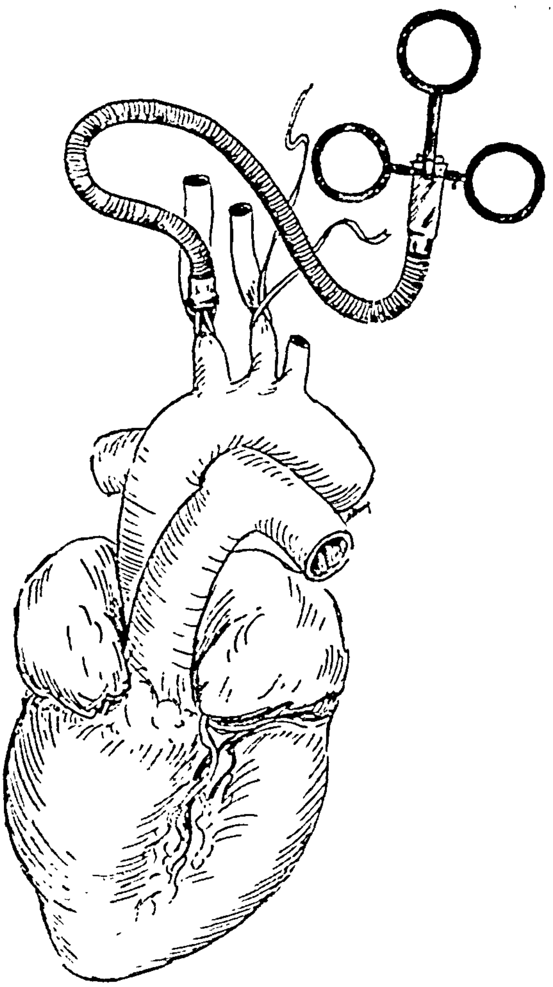

Fig. 7.—Protection of brain from embolism by occlusion of left common carotid and innominate arteries.

TABLE 4.—*Multivalvular Lesions*

	A.S. & M.S.	A.S., M.S., M.I.	A.S. & M.I.	A.I. & M.S.
Age	41.9 Yrs.	36.5	43.3	31.
Sex	M-5 F-14	M-3 F-2	M-2 F-1	M-1 F-0
Duration Subjective Symptoms	5.5 yr.	3 yr.	9 yr.	6 mo.
Mortality, early & late	15.7%	40%	33.3% (1 of 3 cases)	0

Overall mortality—20.7%

TABLE 5.—*Postoperative Evaluation of Survivals*

	Worse	Unchanged	Improved	Marked Imp.
A.S. & M.S.		2	8	6
A.S. & M.S. & M.I.			3	
A.S. & M.I.			2	
A.I. & M.S.			1	

91% of patients were improved

bral sequelae.

Incidence.—The frequency of occurrence of mitral valvular disease is shown to be rather consistent in three separate series of cases of rheumatic heart disease studied at autopsy, as revealed in Table 1.

Likewise, the combination of aortic and mitral valve disease was rather consistent in frequency of appearance in our series. Our figures are consistent with those from the New England and Johns Hopkins series No. 6 as regards the frequency of occurrence of combined mitral and aortic rheumatic valvular disease.

We have so far treated 28 patients with combined aortic and mitral valvular heart disease (Table 3).* While aortic stenosis is generally considered a "man's disease," in our short series the combined lesions were found predominantly in women. The average age of the patients was 40.7 years. The duration of symptoms in those presenting mitral stenosis and aortic stenosis was five and five-tenths years. The average duration of symptoms with coexistent aortic stenosis, mitral stenosis and mitral insufficiency was three years. In the 3 cases of aortic stenosis with mitral insufficiency the duration of subjective symptoms averaged nine years.

The overall mortality rate for the 28 cases was 20.7 per cent. The number of cases is not sufficient for the figures to be statistically significant. It would seem, however, that the combination of mitral stenosis and aortic stenosis offers the best surgical risk of any of the combined lesions.

Postoperative Condition.—Of the patients who survived the operative procedure, 91 per cent were improved or markedly improved, while 9 per cent were unchanged. In no surviving patient was the postoperative condition poorer than the preoperative. The duration of the postoperative period is twelve months in the longest interval and two months in the shortest interval.

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*We have subsequently performed treated cases concomitant aortic and mitral operations in 3 cases, without a death, and in 2 cases in which the mitral valve was explored at the time of aortic dilatation.

SUMMARY

1. With this small series of cases, the figures indicate that concomitant treatment of multivalvular heart disease is within the realm of practicality. The surgical risk is somewhat higher than in the case of either mitral or aortic lesions treated as an isolated entity.

2. In the author's opinion, the mitral valve should be attacked first if there is any reasonable possibility of being able to treat the aortic valve afterward. The point here is that aortic commissurotomy may be performed so much more rapidly than mitral commissurotomy. This is important if quick termination of the operative procedure is necessary.

RESUMEN

1. Con esta pequeña serie de casos, las cifras indican que el tratamiento concomitante de la enfermedad multivalvular está dentro del dominio de la práctica. El riesgo quirúrgico es un poco mayor que en el caso de lesiones mitrales ó aórticas tratadas como entidades aisladas.

2. En nuestra opinión, la válvula mitral debe ser tratada primero si existe posibilidad razonable de poder tratar la válvula aórtica posteriormente. Lo importante aquí es que la comisurotomía aórtica puede ser realizada mucho más rápidamente que la mitral. Esto es importante si es necesaria la terminación rápida del procedimiento quirúrgico.

SUMARIO

1. Com essa pequena serie de casos os autôres afirmam que o tratamento concomitante da doença multivalvular do coração está nos dominios da praticabilidade. Os riscos cirúrgicos não são apreciavelmente maiores que os acarretados pelas lesões aorticas ou mitrais tratadas isoladamente.

2. Na opinião dos autôres a valvula mitral deve sêr sempre inicialmente atingida na hipotese de que a valvula aortica seja dificilmente tratada posteriormente. O ponto de vista assente é de que a comissurotomia aortica pode sêr praticada muito mais rapidamente que a comissurotomia mitral, o que se torna sumamente importante, especialmente, quando uma rapida terminação do processo cirúrgico é necessaria.

ZUSAMMENFASSUNG

1. Die zahlenmässigen Ergebnisse in einer kleinen Reihe von Fällen erweisen, dass die gleichzeitige Behandlung kombinierter Herzklappenfehler im Bereich der praktischen Möglichkeiten liegt. Das Risiko des chirurgischen Eingriffs ist etwas höher, als wenn entweder ein Mitral- oder ein Aortenklappenfehler isoliert behandelt wird.

2. Nach Ansicht der Verfasser soll, wenn die Möglichkeit, die Aortenklappe anschliessend zu behandeln, gute Aussichten hat, die Mitralklappe zuerst angegangen werden. Der Grund ist, dass die Durchschneidung der Aortenkommissur soviel rascher als die der Mitralklappe ausgefuhrt werden kann. Dies spielt eine besondere Rolle, wenn eine schnelle Beendigung der Operation notwendig ist.

RÉSUMÈ

1. A l'aide de cette courte série de cas, les auteurs opinent qu'on peut venir à une conclusion pratique de l'étude des maladies du coeur à lésions multivalvulaires. Toutefois les risques chirurgicaux sont plus élevés que s'il s'agit de lésion simple valvulaire.

2. Les auteurs sont d'avis que les lésions de la valvule mitrale doivent être traitées en premier lieu. La raison étant qu'une commussurotomie de la valvule aortique peut se faire plus rapidement que celle de la valvule mitrale. Ceci a beaucoup d'importance.

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NINTH INTERNATIONAL CONGRESS, 1954

Under the Sponsorship of the Brazilian Government

Notice to All Members of the International College of Surgeons:

The House of Delegates on May 9, 1952, in Madrid, Spain, decided that the City of São Paulo would be the meeting place of the next International Congress, approving the suggestion of His Excellency the Governor of the State, Prof. Dr. Lucas Nogueira Garcez. Brazilian members of the Board of Trustees were appointed to the Commission organizing the Congress, under the direction of Prof. Dr. Carlos Gama, Vice-President of the International Congress and Secretary General for South America.

The Ninth International Congress will be held from April 26 to May 2, 1954. The official topics are (1) experience with socialized medicine in different countries, (2) new uses of radiology with contrast media in the various surgical specialties, and (3) experience with antibiotics in all branches of surgery.

Since the Ninth International Congress will coincide with the Fourth Centennial of the city of São Paulo, it is hoped that the conference, in addition to being one of the most memorable ever held, will add much to the commemorative activities of São Paulo. In order that the Commission may obtain in advance a satisfactory idea of the number who will attend, to arrange the best possible accommodations for them and to insure that the program shall be absolutely functional, all who are interested are requested to write to the address below.

—Prof. Dr. Carlos Gama, Secretaria, Praca Ramos de Azevedo, 7.°
Andar, Sala 710, São Paulo, Brazil.

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Gas Cysts of the Intestine

Report of a Case

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A FAIRLY large number of cases of gas cysts of the intestinal wall have been reported since Bang[1] first drew attention in human pathology to a similar condition well known to veterinarians as occuring in hogs. This condition has masqueraded under various synonyms, of which, probably, "pneumatosis intestinalis" is best known.

The pattern has been uniform in most reported instances: Some obstructive lesion of the upper part of the intestinal tract is present, leading to varying degrees of nutritional deficiency. To my knowledge, gas cysts of the intestinal wall have never been diagnosed prior to actual visualization at operation. The cysts themselves are considered symptomless, but the case here reported indicates that, in part at least, symptoms are referable to the cysts rather than to the pathologic change on which their occurrence is based.

Pathologically, these cysts usually are pea-sized, appear on reddish bases and contain a small quantity of odorless gas. Boyd[2] stated that this gas does not burn; Dale and Pearse[3] stated that it contains neither O_2 nor CO_2, but by a process of dialysis these gases are developed upon exposure to air. The cysts are usually widely disseminated and occasionally, as in the case to be reported, show a tendency to cluster in certain areas. They are usually near the mesenteric border of the small bowel but may be in the areolar tissue of the mesentery or peritoneum of the abdominal wall.

In the present case about one in ten contained a little fluid, mostly clear and limpid, resembling cerebrospinal fluid; occasionally a cyst is noted in which there is a yellowish tinge to the fluid, resembling the color of serum.

Etiologically it is difficult to believe that the gas does not come in some way from the intestine. Bacterial origin is unlikely. Welsh,[4] cited by Finney,[5] suggested a neoplastic origin, but the spontaneous disappearance following secondary exploration renders this equally improbable. Masson[6] suggested that the condition is due to the absorption of gases in solution through abrasions in the gastric mucosa, with subsequent liberation of gas. The total absence of any discernible communication between the cysts may render this doubtful. Air embolism into the lymphatics from abrasions of mucosa are equally difficult to accept, because in most instances the obstruction is gastric and the cysts intestinal, which would presuppose that the gas must be transported against the normal lymphatic flow. Even ascarides have been suggested as the injuring agent. Nevertheless, the most likely explanation is that, in the gastric mucosa above an obstructed lesion, minute abrasions occur; powerful peristalsis forces air from the intestinal tract into the lymphatic or perilymphatic channels as suggested by Kaufman[7] and Karsner.[8] This has never been substantiated experimentally, however. Pybus,[9] cited by Jackson[10], and Sloam reported cases with much gas under the liver associated with isolated cysts. They may occur at any age, and Botsford[11] reported a case in which the patient was an infant. Histologically, almost all reports refer

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*President, Canadian Chapter, International College of Surgeons.

[illegible] Congress of the American [illegible] College of Surgeons, Ch[illegible] [illegible]951.

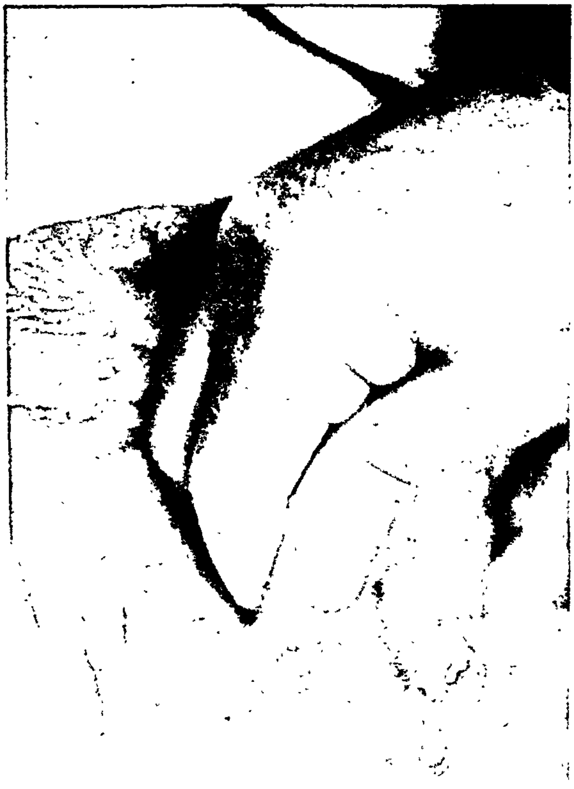

Fig. 1.—Three of many hundreds of pea-sized gas-filled cysts studded throughout the small bowel and the right iliac fossa.

nests of giant cells of the foreign body type with twenty to fifty nuclei.

It is apparent from Jackson's case[10] and one reported by Mori[12] that these cysts will undergo spontaneous regression if the original obstructive lesion is removed. Both authors had an opportunity to reopen an abdomen formerly so affected, and all trace of cysts had disappeared.

REPORT OF CASE

Mrs. H. V. B., a woman aged 57, had had stomach trouble for fourteen years. Roentgen examination in Toronto in 1940 demonstrated an hourglass stomach. The patient was hospitalized in St. Michael's Hospital in that city for five weeks but was not operated on. For the past twelve years she had washed out her own stomach with a stomach tube each night before retiring, frequently washing back fragments of breakfast.

Present Complaints. — The patient complained chiefly of continuing stomach trouble and, for the past two years, low grade constant pain in the right iliac fossa. She complained also of developing constipation and progressive inability to continue lavage, enemas, etc.

Physical Examination.—The patient was gaunt and angular. Her height was 5 feet and 11 inches (180.3 cm). Her weight was 115 pounds (52.1 Kg.) and had been maintained at a reasonably constant level. The blood pressure in millimetres of mercury was 130 systolic and 70 diastolic. The teeth were dentures. Examination of the neck revealed a cystic tumor under the right lobe of the thyroid gland. Thoracic examination showed the heart to be normal and the chest clear. Examination of the abdomen showed it to be thin-walled, with visible coils of bowel and writhing peristalsis. Inguinal hernias were present bilaterally. No actual masses were observed. The cecum was tender, and there was incomplete obstruction of the terminal portion of the ileum.

The genitalia were normal.

Clinical Laboratory Data.—The value for hemoglobin was 86 per cent. The leukocytes numbered 4,650 per cubic millimetre of blood, with 55 per cent lymphocytes, 41 per cent monocytes and 4 per cent basophils. The result of the Kahn test was negative.

Admission.—The patient was admitted to the hospital on Oct. 14, 1950.

Hospital Investigation.—There was achlorhydria, with no response to histamine. The patient retained 560 cc. of fluids overnight in spite of gastric suction on the previous evening.

The value for blood chlorides was 386 and that for blood protein 5.2. The hematocrit reading was 36. The prothrombin time was 70 per cent of normal. Examination of the stools revealed no occult blood. The basal metabolic rate was plus 12.

Roentgen Investigation.—This examination disclosed the chest to be clear and the heart moderately enlarged. A preliminary film of the colon showed some calcified glands in the right lower psoas area and some arthritic changes in the lumbar area, particularly on the right.

A barium enema passed without obstruction through the large bowel to the cecum, but the cecum was rather hard to fill. No definite filling defects or breaks in the pattern of the mucous membrance could be seen, and the cecum eventually filled. It seemed to be fixed and extremely tender.

Follow-Up Series on Gastrointestinal Tract: The patient was given a glassful of barium mixture at 5 a.m.; films were taken at 8 a.m. and at intervals of one and one-half hours thereafter up to 4:30 p.m. The first, or three-hour film showed some barium retained in the upper part of the stomach, but the main part of the meal was in the lower half. As before, a constriction was noted about the middle third, suggesting an hourglass type of stomach. The duodenal cap was not well visualized, and at this time some of the barium was scattered throughout the duodenum and the upper part of the jejunum. At four and one-half hours there was still about the same amount of barium in the upper part of the stomach, but the head of the meal had moved farther forward in the jejunum. Each succeeding one-and-one-half-hour film showed lesser amounts of barium in the upper part of the stomach, with the head of the meal going forward in the small bowel, until at twelve hours there was barely a trace of barium in the upper part of the stomach. The head of the meal was as far forward as the terminal portions of the ilium and the cecum, and at this time there was approximately 60 to 70 per cent of the barium still retained in the lower half of the stomach.

Conclusions.—No definite conclusions could be reached as to the pathologic condition existing in this stomach. However, in view of the hourglass appearance of this organ and the fact that at no time was the duodenal cap visualized, the probability of an obstructive lesion was suggested, perhaps a healed or scarred ulcer in or around the pylorus or the duodenal cap, since there was 60 to 70 per cent retention in the lower part of the stomach twelve hours after ingestion of the barium meal.

Impression: The impression resulting from these observations included (1) marked pyloric obstruction due to scarring; with a high degree of gastric retention; (2) hourglass contracture due to a cicatrix from an old contracted gastric ulcer; (3) achlorhydria; (4) an indeterminate lesion in the right iliac fossa, partially obstructive; bilateral inguinal hernia, and (6) a cystadenoma of the thyroid.

Operation.—On Oct. 20, 1950, gastric resection was performed. The abdomen was opened by a right rectus incision; an extraordinary condition presented. There were hundreds of small gas-filled cysts in the peritoneum of the abdominal wall, the right iliac fossa, cecal area and the area of the ascending portion of the colon. To a lesser extent the small bowel was involved. These cysts all contained gas, many of them both fluid and gas. In most of them the fluid was limpid and clear, in others more like serum. The stomach showed almost complete obstruction at the pylorus. The stomach was very thick walled and hypertrophic and had a central constriction dividing it into upper and lower pouches, the channel between being just large enough to insert an ordinary artery forceps. All other viscera were approximately normal, with some calcified glands in the lower ileal mesentery.

Gastric resection was done, and many small cysts were removed for pathologic investigation. There was no actual organic obstruction to the terminal portion of the ileum, and it was left intact in the belief that the cysts would absorb after gastric resection.

The large left-sided hernia containing omentum was not touched, and the right sac was merely turned inside out and anchored. The abdomen was closed.

Pathologic Report. — The specimen consisted of tissue from the peritoneal wall. The results of gross examination were as follows: "The specimen consists of a quantity of membranous tissue containing some peritoneum along one aspect and measuring approximately 4 cm. in diameter by 0.6 to 1.2 cm. in thickness. Along one surface are large numbers of tiny cystic structures varying in diameter from 1 mm. to 0.8 cm. These are observed to contain air under considerable tension, and none of them appears to contain any fluid, either lympholyogenous or myoxmatous. This specimen contains a fairly well circumscribed lymph node-like structure. Received with the specimen are two or three smaller air-filled cysts, none of which appear to communicate with any other."

Microscopically the following appearance was reported: "A great many sections were taken through the various portions of the aforedescribed tissue, and they show a well vascularized, loosely arranged fibrous and fatty tissue, with many of the vessels showing considerable engorgement. Edema and hemorrhagic extravasation are observabl here and there. Some of the sections sho fairly large, almost shee a semihyaline fibrous connective tissue; in others a more fibrin-like material is present and is undergoing organization. These surround spaces of various size and shape. In many instances, these collapsed cystic spaces have rather thinner walls and apparently correspond to the air-filled cysts observed grossly. There is some old blood pigment scattered here and there throughout the fibrous tissue, in which there is also some lymphocytic and plasma cell infiltration, and here and there an occasional small nest of foreign body giant cells is noted. There is no suggestion of malignancy or specific inflammatory process. This probably is an instance of so-called chronic mesenteric pneumotosis."

Postoperative History.—The postoperative course was uneventful, and the patient was discharged from the hospital on the thirteenth postoperative day, feeling well. The tenderness in the right iliac fossa was disappearing. The bowels were stubborn, but there was no sign of any further obstructive symptoms.

May 1951.—The patient had gained 15 pounds (6.8 Kg.) in three months but had been losing weight recently. The abdomen, the stomach and the intestines were normal. The left inguinal hernia was not a problem. The pulse rate was 112. Auricular fibrillation was noted, and the A waves on the electrocardiogram showed an abnormal contour. The basal metabolic rate was plus 19.

July 1951.—A recheck showed the basal metabolic rate to be plus 37. There were no further abdominal symptoms, but at the time of writing the patient is awaiting thyroidectomy.

SUMMARY AND CONCLUSIONS

A case is presented in which gross gastric obstruction and symptoms referable to the ileocecal valve area suggested obstruction. The only pathologic condition observed in this region consisted of thousands of small gas-filled cysts, indicating that such cysts, if closely bunched together, may cause symptoms of their own. The cysts require no treatment whatever. Correction of the basic obstructive condition is all that is necessary.

In the author's opinion the gas must come in some way from the intestine, but the explanation of its occurrence in discrete blebs on the parietal peritoneum is not clear. All suggested etiologic theories are open to question.

CONCLUSÕES

E' apresentado um caso no qual grande obstrução gastrica e sintomas atribuiveis a area ileo-coecal sugeriam sua obstrução. A unica alteração patologica encontrada nesse distrito consistia em milhares de pequenos cystos cheios de gas. Isso indica que tais cystos, si intimamente aglomerados, podem causar sintomas proprios. Nenhum tratamento contudo é requerido para os cystos. Correção da molestia obstructiva basica é tudo que é requerido. Na opinião do autor o gas vem do intestino, mas a explicação de sua occurencia sobre o peritonio parietal em forma de bôlhas não é clara. Todas as teorias sugeridas para explicar a etiologia estão abertas á discussão.

CONCLUSIONS

On prèsente un cas d'obstruction gastrique et de symptôme d'obstruction de la valvule iléo-coécale. La seule lésion trouvée dans cette région était la présence d'une multitude de petits kystes gazeux. Ceci indique que de tels kystes groupés ensemble peuvent causer leur propres symptômes. Il n'y a pas de traitement pour ces kystes. La correction de la cause premiére de l'obstruction est seulement requise. D'après l'auteur, le gaz vient de l'intestin mais l'explication de sa présence sur le péritoine pariétal sous forme de petites bulles n'est pas claire.

On peut suggérer toute étiologie.

CONCLUSIONI

Viene presentato un caso in cui sintomi riferibili allo stomaco ed alla valvola ileo-cecale fecero pensare ad uno stato occlusivo. L'unico fatto patologico rinvenuto consistette, invece, nell'esistenza di migliaia di cisti a contenuto gasoso. Ciò sta ad indicare che tali cisti, se strettamente accollate a grappolo, possono di per sè stesse dare segni clinici. L'unico provvedi-

mento da adottare in tali casi non va rivolto alle cisti ma allo stato occlusivo.

L'A. pensa che il gas provenga dall'intestino, per quanto la spiegazione della sua presenza sul peritoneo parietale in bolle simili a quelle prodotte dai vescicanti sia tutt'altro che facile. Ogni teoria etiopatogenetica proposta rimane pertanto aperta alla discussione.

CONCLUSIONES

Se presenta un caso el que obstrucción gástrica y síntomas atribuibles a la región ileocecal sugirieron obstrucción. El estado patológico que se encontró en esta zona consistió en la presencia de miles de pequeños quistes llenos de gas. Estos indica que dichos quistes, si se encuentran estrechamente arracimados, pueden causar síntomas por sí mismos. Sin embargo, no se requiere tratamiento para los quistes. Todo lo que se requiere es la corrección del estado obstructivo básico.

En opinión del autor, el gas procede del intestino pero la explicación de su ocurrencia sobre el peritoneo parietal en discreto proceso vesiculiforme no es clara. Todas las teorías tiológicas al respecto está a discusión.

ZUSAMMENFASSUNG

Es wird ein Fall vorgestellt, in dem eine grobe Versperrung des Magens vorlag und Symptome in der Gegend der Ileozoekalklappe auf Verschluss hindeuteten. Der einzige Krankheitszustand, der in dieser Gegend gefunden wurde, bestand in tausenden von kleinen gashaltigen Zysten. Das bedeutet, dass solche Zysten, wenn sie eng zusammengeklumpt sind, von sich aus Symptome hervorrufen koennen. Die Zysten selbst beduerfen keinerlei Behandlung. Die Beseitigung der zugrundeliegenden den Verschluss verursachenden Erkrankung ist alles, was noetig ist.

Nach der Meinung des Verfassers stammt das Gas aus dem Darm; das Vorkommen von Gas in einzelnen kugligen Blaeschen am parietalen Bauchfell kann allerdings nicht erklaert werden. Alle vorgeschlagenen aetiologischen Theorien sind fraglich.

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Foreign Interns and Residents Available

Approved hospitals in the United States and Canada have openings for interns and residents are requested to communicate with the Secretariat of the International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

morphine sulfate is recommended. With aseptic technic and local anesthesia, the 13-gauge needle with the attached stopcock and syringe containing dilute heparin in saline solution is inserted into the femoral artery at an angle of 45 to 60 degrees, guided by its pulsations. The catheter filled with dilute heparin in saline solution and closed with the 17-gauge needle and needle plug, is passed through

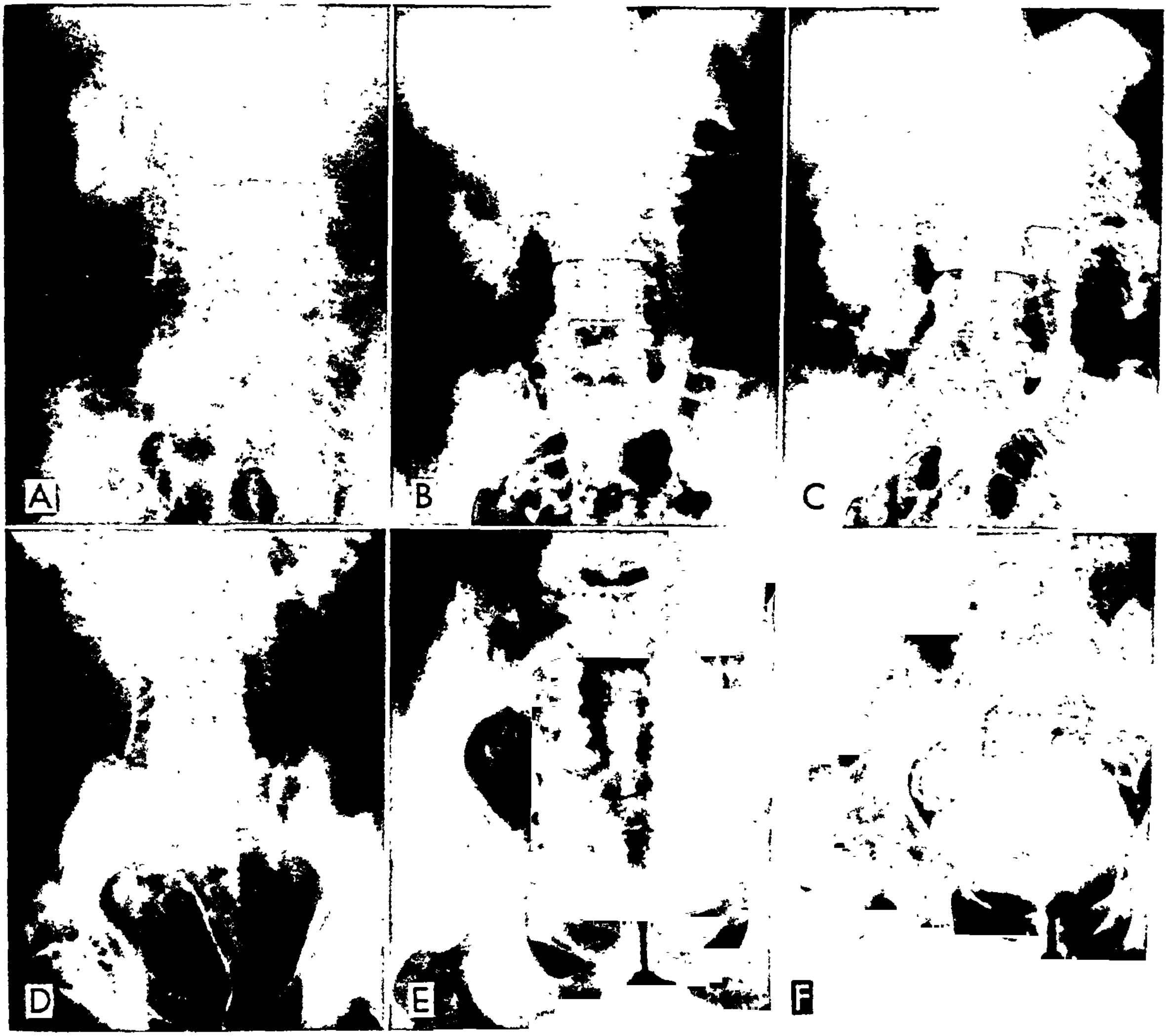

Fig. 4.—*A*, *B* and *C*, case of a 52-year-old white man with a large mass in the right flank, thought to be a neoplasm. *A*, retrograde pyelogram showing right hydronephrosis and marked pyeloparenchymal backflow. *B*, early arterial filling, showing hydronephrosis and the upper of two renal arteries poorly filled. *C*, the nephrogram phase, showing a nonfilling area in the upper medial part of the kidney, consistent with inflammatory destruction. There is reduced flow through the upper artery. The hydronephrosis was due to ureteropelvic obstruction by a large perinephric inflammatory mass (as indicated by biopsy) which displaced the kidney downward. The decreased blood flow and parenchymal damage in the upper part of the kidney suggest that the mass was secondary to renal infection. *D*, *E* and *F*, case of a 48-year-old white man with a large right pelvic (retroperitoneal) mass palpable rectally. He was referred with a diagnosis of primary neoplasm probably arising from the bony pelvis. A vascular lesion was suspected and its presence confirmed by arteriographic study. *D*, ureteral and cystic displacement by mass. *E*, irregular calcification appearing to involve the ischial spine. *F*, arteriogram showing large cirsoid arteriovenous aneurysm fed by right hypogastric and superior hemorrhoidal arteries. (Films in both cases taken by Dr. W. Paul Ramey. *E* and *F*, courtesy of *Surgery, Gynecology and Obstetrics*.)

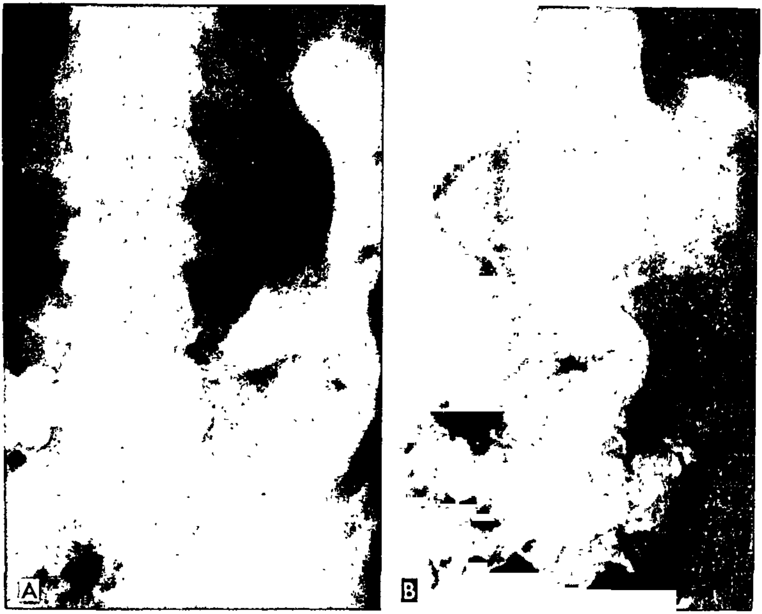

Fig. 5.—Case of a 65-year-old Negro with a very large midabdominal mass. *A*, a gastrointestinal film showing marked displacement of the stomach by the mass. *B*, abdominal aortagram demonstrating marked aortic tortuosity. Contrast medium fills the lower portion of a large aneurysm by retrograde force. Barium is present in the transverse portion of the colon. (Courtesy of *Surgery, Gynecology and Obstetrics.*)

the stopcock-needle combination and advanced for 6 to 12 inches (15 to 30 cm.). This should take place easily, and enough force to kink the catheter should not be exerted. At this point the needle is withdrawn over the catheter, which is then placed at the desired level, usually about 14 inches (35 cm.) for renal arteriographic film (Fig. 1 *B*).

A film to check the position of the catheter tip is taken immediately after injection of 1 or 2 cc. of diodrast. This also serves for a sensitivity test. The catheter tip should generally be at the level of the second lumbar vertebra for a renal arteriogram, higher for the celiac axis, and lower if renal filling is not desired, but there is considerable anatomic variation (Fig. 1 *C*). Ten or 20 cc. of 70 per cent diodrast should be injected as rapidly as possible from a 10 or 20 cc. syringe, and the time required will usually be two to five seconds. The catheter and the patient are easily repositioned, and multiple injections are usually possible. Potter-Bucky roentgen films at 1/5 or 1/10 second and dense enough for bone detail are suitable for aortograms.

At the completion of the [illegible] the catheter is withdrawn and [illegible] tinuous pressure is exerted at [illegible] puncture until bleeding has

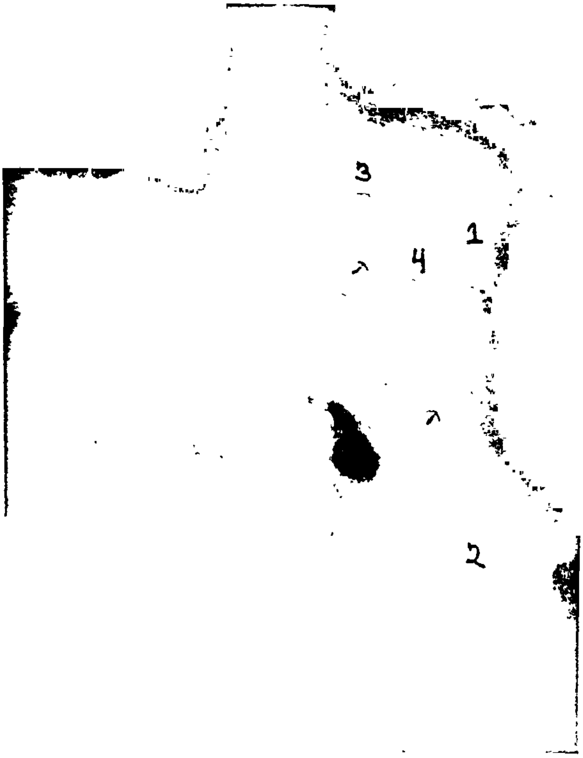

Fig. 6.—Case of a 55-year-old white man with a large left abdominal mass thought to be retroperitoneal but shown by its blood supply to be clearly splenic. *1*, mass; *2*, kidney displaced into pelvis; *3*, splenic artery; *4*, hilum of spleen. Details are obscured because the patient was obese. (Film taken by Dr. W. Paul Ramey).

a small pressure dressing is applied. This generally takes place within three to five minutes. No restriction of activity beyond one or two hours is necessary.

A more complete study is possible if a rapid cassette changer such as the Sanchez-Perez Seriograph is available (Fig. 7).* Among other advantages, this enables various phases of renal filling to be shown after a single small injection (Figs. 2, 4, 7 and 9). According to Dr. Willard Goodwin, the arteriographic results may be improved by the simultaneous use of retroperitoneal oxygen or carbon dioxide insufflation, which outlines the kidney and other organs.[11]

A few special precautions should be mentioned. If there is difficulty in passing the catheter through the needle into the artery, various needle positions should be tried gently and carefully before withdrawal, as it is not as easy to insert the needle a second time. Pressure enough to kink a catheter should never be applied, and if kinking occurs the catheter should be discarded. Occasionally an iliac artery is so tortuous that a straight catheter will not pass. A catheter with a slightly curved tip made by gentle heating may then be tried and will frequently solve the difficulty. To prevent shearing, a catheter should not be manipulated with the needle in place unless it slides easily.[12] Bleeding and hematoma formation may easily be prevented by careful hand pressure in the groin and has never been serious. Injecting into the catheter, etc., is simplified by using a small sprung hemostat with rubber tubing over the jaws to effect temporary occlusion of the catheter. Patients should be told that they will experience a momentary feeling of heat and possibly mild pain immediately after the injection. If this is not done, they will frequently move and spoil the film. The usual precautions should be taken with regard to hypersensitive reactions. Concentrated diodrast, neoiopax and urokon are all suitable contrast media. Although they vary somewhat in ease of injection, all may be introduced rapidly if

Diagnostic Help of Aortographic Study in the Presence of Retroperitoneal Masses

1. Mass may be shown to be spleen, kidney, or adrenal by its characteristic blood supply.
2. Aneurysms may be positively diagnosed.
3. Characteristic patterns allow pathologic diagnosis of many renal masses, including hydronephrosis, tumors, cysts and malformations.
4. Kidney, aorta, and iliac artery may be excluded by demonstrating their normal vascular pattern.
5. Tumors may sometimes be identified by increased regional vascularity or by pooling of contrast medium.
6. Location and size of a mass may be shown by displacement of aorta, iliac arteries, kidneys, etc.
7. Vascular involvement, including obstruction by infiltrating tumor, may sometimes be demonstrated.

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*Automatic Seriograph Co., College Park, Maryland.

a syringe of no larger capacity than 20 cc. is used.

Use and Interpretation of Arteriograms. — A normal abdominal arteriogram will frequently delineate all of the major arteries clearly (Fig. 2). Of particular interest are the splenic, hepatic, superior mesenteric, adrenal, renal and iliac arteries. Often even small anatomic divisions are easily identified. Renal arteriograms are somewhat simpler to interpret if the celiac axis is not injected, and this is not difficult to avoid (Figs. 2 *B* and 3). In the case of the kidneys, films a little after peak arterial opacification result in a clear outlining of the entire parenchyma. Such a picture is most frequently called a nephrogram, and it is a very useful part of renal delineation (Fig. 2). It is seen to a lesser extent after venous injection of diodrast but will not occur with sodium iodide and other materials not cleared by the kidney. Cysts, tumors and areas of inflammatory destruction will often be clearly visible against the background of the nephrogram (Fig. 4).[13]

Arteriographic study assists in the differentiation of retroperitoneal and abdominal masses in a number of ways (see table). If the mass is arterial or includes the spleen or the kidney it can usually be identified with certainty, and if it is adrenal it may occasionally be identified. Many abdominal masses pulsate by transmission, but aortographic study permits a positive diagnosis of aneurysm when

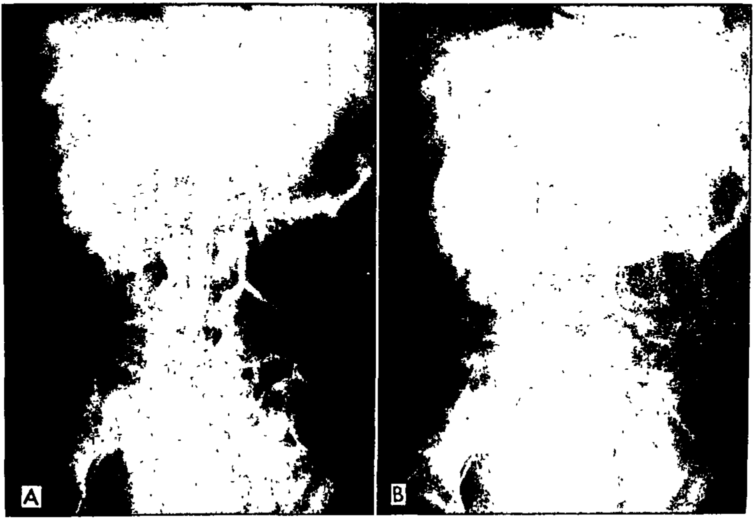


Fig. 7.—Case of an 8-year-old white boy with a pheochromocytoma. An arteriogram was taken localization. Eight films were taken at 0.5 second intervals, a Sanchez-Perez Seriograph being after the injection of 10 cc. or neo-iopax. *A*, (second film taken), mass outlined indistinctly the right upper kidney pole, which is flattened. The inferior adrenal artery is injected. *B* (se film taken), adrenal mass distinct in nephrogram. This case is includ sy of Dr. E Belt. The percutaneous catheter aortogram was taken by Dr. Wi
California School of Medicine, Los

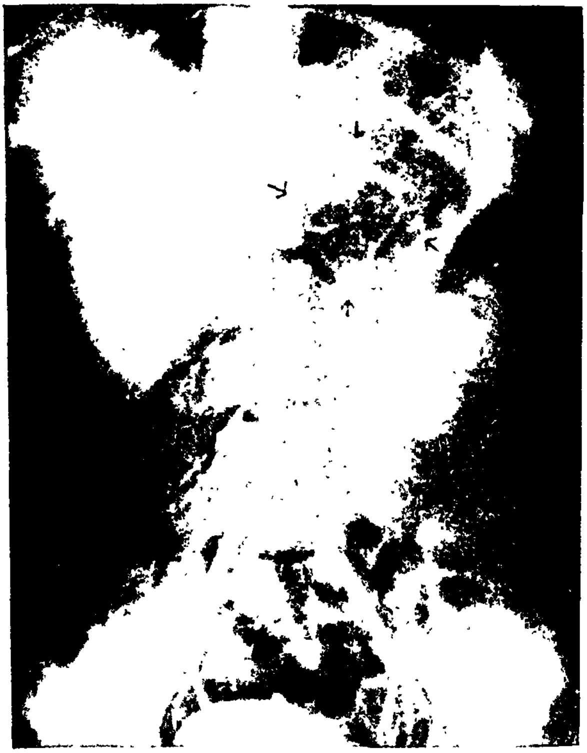


Fig. 8.—Case of a 4-year-old white boy with a small mass in the left flank and precocious sexual development. The "bone age" was 12 years. The urinary steroids were elevated. A pyelogram showed a normal left kidney displaced downward and rotated laterally. The aortogram confirmed the kidney displacement and showed an area of irregular increased vascularity above the upper pole. A later film might have delineated the tumor parenchyma. At operation a cortical tumor 7 cm. in diameter was removed. A catheter passed after femoral artery "cut-down," (Harriet Lane Home, Johns Hopkins Hospital).

present (Fig. 5). In 12 cases referred for aortographic investigation of possible aneurysms reported by Deterling, all of the lesions were found to be something else.[14] It is not always possible to differentiate a retroperitoneal mass from an enlarged spleen, but this can be done with certainty by identification of the splenic artery supplying the mass (Fig. 6). Adrenal masses are frequently small, but they may show a sufficient irregular increase in vascularity to permit their identification (Fig. 7) and occasionally closely resemble a nephrogram (Fig. 2*C*). In the case of renal masses, arteriographic study not only permits identification of the kidney as the offending organ but often allows a more precise diagnosis. Hydronephrosis is of course usually recognized pyelographically, but a rather characteristic spreading of the arteries seen in an arteriogram (Fig. 4 *B*) may be helpful in difficult cases, and when aberrant vessels are the cause this is clearly revealed. Neoplasms may give very characteristic patterns. Hypernephroma generally shows pooling of the contrast medium, probably in areas of necrosis, and this may sometimes be seen in the absence of pyelographic abnormalities (Fig. 9).[15] This pooling may also permit differentiation between cysts and neoplasms.[16] Polycystic disease may show fairly typical arterial bending about the cysts, but this is by no means general, and pyelographic examination is usually a better guide.[16] Unilateral hypertrophy, aneurysms and numerous anomalies are clearly shown arteriographically but are not important causes of retroperitoneal masses (Fig. 10).

When the questionable mass does not arise in the aorta, the iliac artery or the kidney, these organs may generally be excluded on the basis of arteriographic evidence (Fig. 11). Perinephric lesions or lesions of the renal space may be indistinguishable from a true renal lesion by physical examination and the usual diagnostic procedures. Although these masses may not show any characteristic vascularization, the arteriogram, by disclosing a *normal renal vascular pattern* and outline, may unequivocally exclude the kidney as part of the mass. A defect in the nephrogram may suggest that the perirenal mass has its origin in a renal lesion (Fig. 4).

The retroperitoneal mass may be outlined arteriographically in instances of tumor with increased vascularity (Figs. 7). Diodrast may pool and thus assist both in outlining and in precise diagnosis. Usually, however, the mass is revealed aortographically only when there is aortic or iliac displacement, and this may not occur unless the mass is large. Deterling has described bowing of the aorta with kinking of the iliac artery on the side

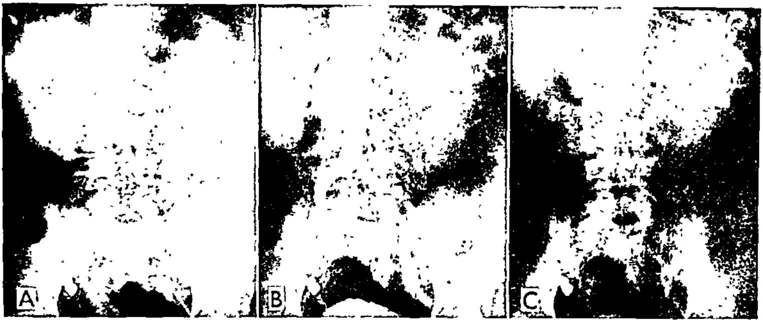


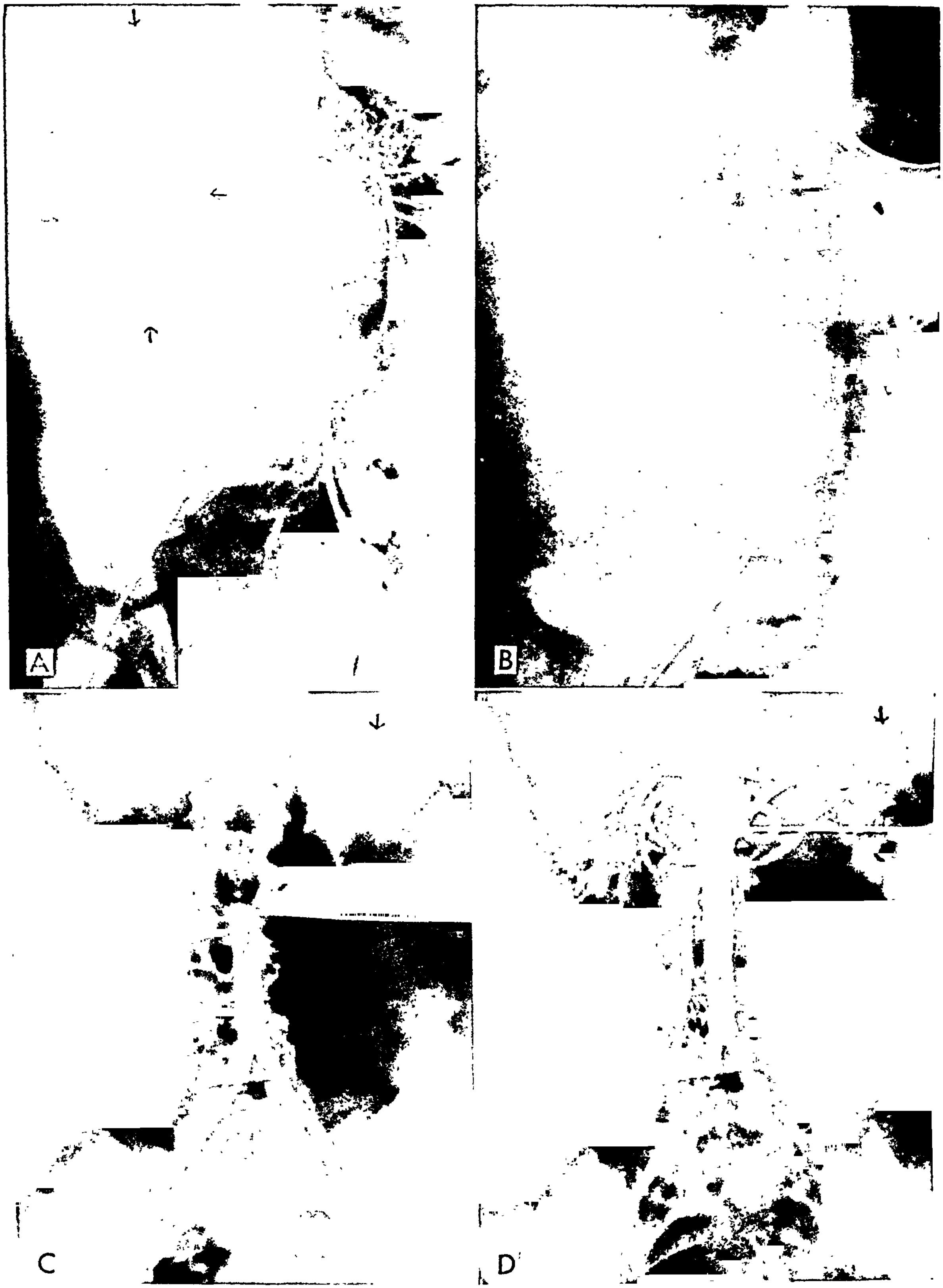
Fig. 9.—Case of a 57-year-old Negro with a destructive rib lesion shown on biopsy to be hypernephroma. *A*, intravenous pyelogram showing marked compression and deformity of the left kidney pelvis. *B*, arteriogram showing some pooling of diodrast in the left kidney, but this is not striking. *C*, later nephrogram showing classic marked pooling of diodrast and outlining a central ovid mass.

of the aortic convexity as diagnostic of a mass displacing the aorta.[16c] This is not entirely accurate, as has been shown in instances of hypertension and arteriosclerosis (Figs. 3 and 10). In general, displacements of the aorta and its large branches are more difficult to interpret than corresponding ureteral displacements,[17] but they *may nevertheless be quite helpful* (Figs. 13 and 14*B*).

Actual vascular involvement by a mass may be of great diagnostic and prognostic significance and generally indicates a neoplasm. Either artery or vein may be involved, but only arterial involvement will usually be seen in abdominal aortograms. Examination of veins may be carried out when aortographic study is performed without much additional effort, and this may occasionally produce striking results (Fig. 14*A*).

Sometimes, when *minor defects* are seen in pyelograms, aortographic study can be used to exclude the presence of extrinsic mass lesions. This was possible in a case of solitary metastasis to the left ureter from a malignant melanoma. An absolutely normal vascular pattern was present in the region, and at operation the lesion was

Fig. 10.—Case of a 68-year-old white man with aneurysm of the renal artery confirmed by operation. Note: Aortic and iliac tortuosity resulted not from a mass displacement but from hypertension. (*Sinai Hospital, Baltimore*").


A
B
C
D

ig. 11 (opposite).—*A* and *B*, case of a 2-year-old white child with a very large mass in the right flank nd the abdomen, thought to be a Wilms tumor or a neuroblastoma on the basis of an intravenous pyelogram. *A*, aortogram showing a normal renal vascular pattern and vaguely outlining the kidney. The size of the mass is indicated by the density of the right side of the abdomen. There is no aortic displacement. *B*, nephrogram clearly outlining a normal kidney in the normal position. A retroperitoneal mass was ruled out. At operation a large choledochal cyst was discovered. (University of Texas Medical School, Galveston, service of Dr. John T. Moore; percutaneous aortogram by Dr. Charles A. Hooks). *C* and *D*, case in which formation of hematoma occurred as the result of a translumbar arteriogram. A 17-gauge needle was used. *C*, initial aortogram, showing kidney in normal position. *D*, later film, showing marked lateral displacement of the kidney, undoubtedly the result of retroperitoneal bleeding. (Courtesy of Dr. Robert N. Cooley, John Hopkins Hospital).

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observed to be limited to the ureter (Fig. 15*C*).

Comparison of Translumbar and Percutaneous Methods.—Both translumbar and percutaneous methods may readily be learned by anyone seriously interested, and both employ quite simple equipment. The translumbar method is somewhat easier to perform and is less time-consuming. It is suitable for routine abdominal aortograms taken with the patient in the prone position. If a Tuohy point needle is employed so that the stream of contrast medium may be directed in various directions, good films may usually be obtained with a single insertion of the needle.[7] Nevertheless, it may sometimes be difficult to deposit the diodrast in the right position, and clear films of the precise region needed may not be obtainable. There is some danger of extravascular injection, which, although not dangerous, may be extremely painful to the patient. Although many workers deny it, a sizable hematoma may result (Fig. 11*C* and *D*).[18]. The method is probably not very suitable in children because of greater difficulty in inserting the needle into the aorta.[19]

The percutaneous method can be carried out in a more leisurely fashion. Very precise placement of the injected dye is possible. When renal arteriograms alone are desired, injection of the celiac axis and the superior mesenteric artery may be avoided. This is especially important in evaluation of adrenal lesions, which may be obscured by the overlying hepatic and splenic arteries. The patient may be placed in any desired position and may be moved from place to place. There is no difficulty at all in keeping the catheter patent. The method should be used with caution in the presence of severe peripheral vascular disease and is difficult in obese patients. In children it may be necessary to cut down on the femoral artery, but percutaneous catheterization has been used in children

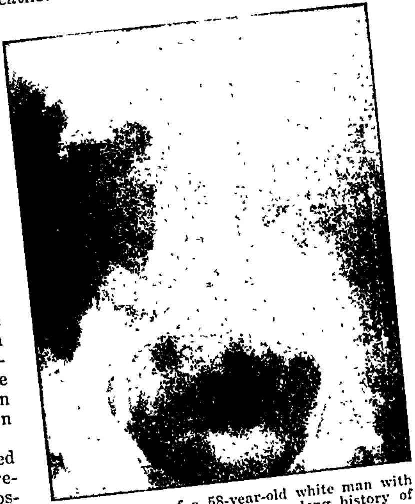

Fig. 12.—Case of a 58-year-old white man with a mass in the left flank and a long history of pain and urinary symptoms. Ureteral obstruction and hydronephrosis were observed on retrograde pyelographic study. Arteriograms taken in several projections showed marked anterior displacement of the left iliac artery. At operation a heavy walled retroperitoneal abscess was observed, extending from the region of the kidney behind the iliac vessels, A diagnosis of per
nephric abscess was U. S. Public He
Service Hospital Texas; Aorto
by own).

as young as 2 years of age (Fig. 11).

In both methods the tip of the catheter or needle should be shown to be in the aorta. Injection directly into a branch vessel may cause serious complications, including death.[20] Whenever the percutaneous method is used for thoracic aortographic study, special precautions to avoid cerebral complications should be observed.[21] In deference to the comfort and safety of the patient aortographic procedures should not be employed to satisfy idle curiosity. Their use where indicated, however, is quite easy and safe and it will result in a better work-up on the patient and considerable gratification to the physician.

SUMMARY

The diagnosis of retroperitoneal masses is a challenge not always easily met. Readily available information about a mass may be considerably augmented, however, by abdominal aortographic procedures. Percutaneous catheterization of the aorta via the femoral artery allows accurate injection of a contrast medium with the patient in any position and is the most satisfactory method available. It is fairly readily learned and is economical of personnel and equipment. Its use in the elucidation of retroperitoneal masses is described and illustrated.

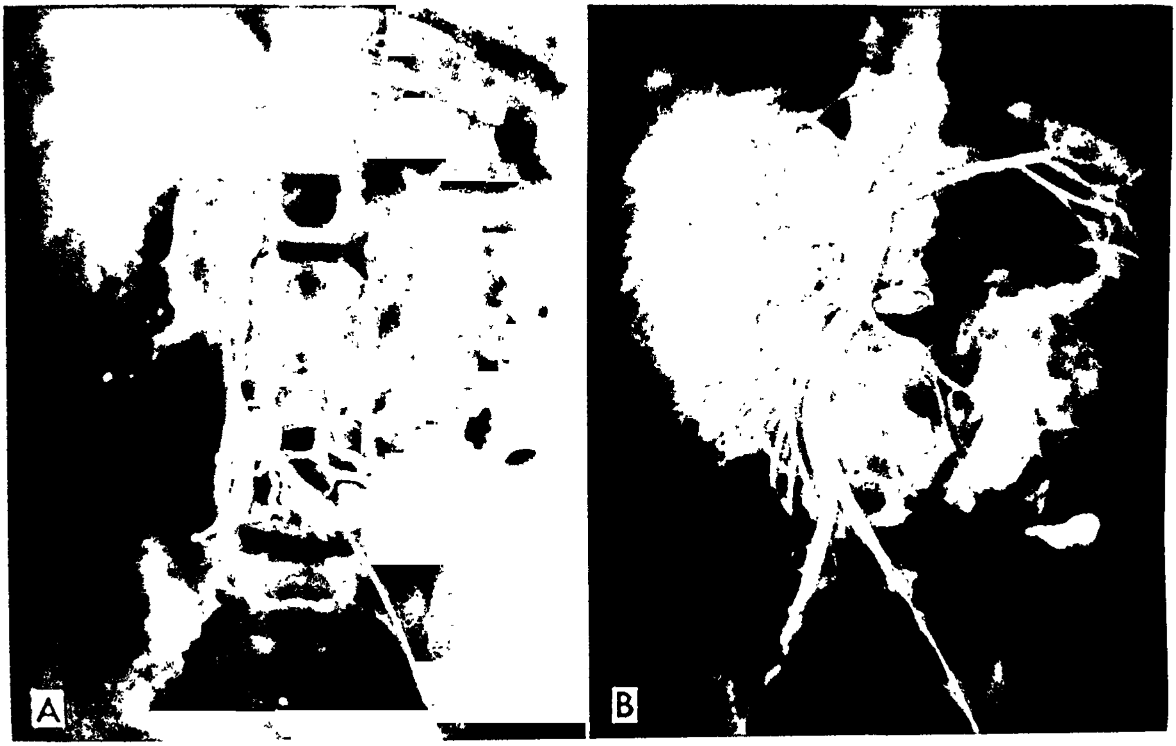

Fig. 13.—Case of a white 4-year-old boy with hematuria and a mass in the left flank. The left kidney was not visualized on an intravenous pyelogram. *A*, venagram of inferior vena cava (percutaneous femoral vein) shows obstruction of the cava and contrast medium diffusely scattered through the area of the left-sided mass. *B*, arteriogram showing spreading of the branches of the left renal artery. Some contrast medium remains in the area of the renal mass. The aorta is displaced to the right. Other vessels are normal. A diagnosis of Wilms tumor was confirmed at operation. There was no extravasation and the inferior vena cava was obstructed by tumor invading from the renal vein (John Sealey Hospital, University of Texas Medical School, Galveston; percutaneous femoral aortogram by Dr. Raymond N. Brown; Venagram by Dr. Graves).

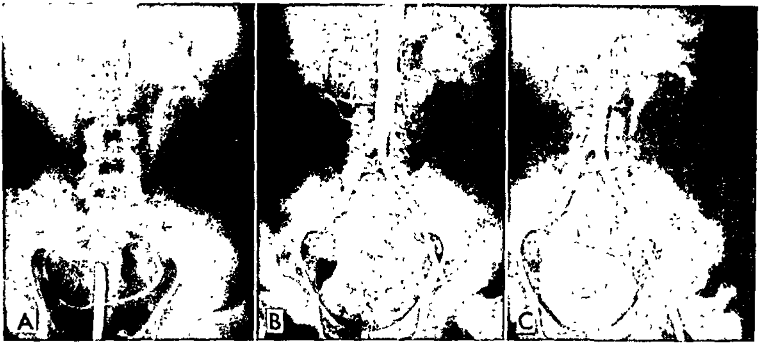

Fig. 14.—Case of a 51-year-old white man who had previously undergone a dissection of the left femoral nodes for melanoma. *A*, retrograde pyelogram showing a filling defect in the lower third of the left ureter with accompanying hydronephrosis. *B*, renal arteriogram which fails to reveal the nature of the ureteral obstruction. The right iliac artery shows loss of continuity as a result of the previous surgical procedure. *C*, arteriogram with maximum concentration of diodrast in the left iliac artery, showing no evidence of a mass. At operation a metastatic melanoma nodule was observed, limited to the interior of the ureter. (Roentgenograms by Dr. W. Paul Ramey.)

SUMÁRIO

O diagnostico das tumorações retroperitoneais é um problema ainda não facilmente solucionado.

Essa trefa, todavia, poderá sêr mais facilitada, se se lança mão dos processos de arteriografia da aorta abdominal. O cateterismo da aorta através a arteria femural é o metodo mais satisfatório e de real valôr, permitindo, em qualquer posição do doente, uma cuidadosa injeção do meio de contraste. E processo facilmente assimilavel, sendo econômico quanto ao pessoal e equipamento necessários. O seu emprego na elucidação das tumorações retro-peritoneais e descrito e ilustrado pelo autôr.

RIASSUNTO

La diagnosi di massa retroperitoneale non sempre è facile, tuttavia le tecniche di aortografia addominale possono fornire utili informazioni sussidiarie. Il cateterismo percutaneo dellà aorta attraverso l'arteria femorale consente una accurata iniezione del mezzo di contrasto, col paziente in ogni posizione ed è il più soddisfacente dei mezzi disponibili. E' facile da apprendere ed economico di personale ed attrezzatura. Ne viene descritto l'impiego nella diagnosi di masse retroperitoneali.

RÉSUMÉ

Le diagnostic des tumeurs rétropéritonéales n'est pas facile. Le diagnostic doit s'aider d'aortographie. L'auteur suggére un procédé pour le diagnostic des tumeurs rétropéritonéale.

RESUMEN

El diagnóstico de las tumoraciones retroperitoneales es un desafío no siempre facil de encontrar. Sin embargo, puede ser considerablemente aumentada la información rápida sobre una tumoración por medio de la angiografía aórtica abdominal. La cateterización percutánea permite la inyección precisa de un medio de contraste con el paciente en cualquier

ción, y es el método disponible más satisfactorio, de aprendizaje bastante rápido y de personal y equipo económicos. Se describe e ilustra su uso en la elucidación de las tumoraciones retroperitoneales.

ZUSAMMENFASSUNG

Die Diagnose retroperitonealer Tumoren begegnet Schwierigkeiten, die nicht immer leicht zu ueberwinden sind. Rasch erhaeltliches Informationsmaterial ueber den Tumor kann aber mit Hilfe der abdominellen Aortographie in betraechtlich groesserem Umfang gewonnen werden. Die perkutane Katheterisierung der Aorta auf dem Wege ueber die Oberschenkelschlagader gestattet die sichere Einspiritzung eines Kontrastmittels in jeder beliebigen Lage des Kranken. Von allen zur Verfuegung stehenden Methoden ist dies die befriedigendste. Sie kann leicht erlernt werden und erfordert keinen grossen Aufwand an Personal und Apparatur. Die Anwendung des Verfahrens in der Diagnose retroperitonealer Tumoren wird beschrieben und mit bildlichen Darstellungen erlaeutert.

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Tuberculosis of the Mammary Gland

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AND

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THE human breast was regarded as immune to tuberculosis until attention was drawn to the condition by Sir Astley Paston Cooper[1] in 1829. Half a century later Dubar[2] described it fully and established it as a clinical entity.

The condition is rare, and the case here reported is probably only the 535th to be recorded. It is extremely likely, however, that other cases have escaped correct diagnosis, and that more still have been recognized but have remained unchronicled.

Interest in the mammary gland has greatly increased and has presented the medical profession with many varied and interesting problems — the prevalence of mammary tuberculosis in the cow and its absence in the goat; the coexistence of tuberculosis and carcinomatous conditions; the possibility of the transmission of carcinoma to the offspring via Bittner's[3] milk factor.

The present case is considered worthy of record for several interesting features it presents:

1. The determining factor in the location of the lesion which appears to have been trauma.
2. The exacerbation which occurred simultaneously with lactation.
3. The complete localization of the disease to the gland.
4. The value of mammoscopic and radiologic studies in early diagnosis, which is so important both from the therapeutic and prognostic standpoints.
5. The results of examination of the discharge, and the biologic picture.
6. The electrosurgical technic as an advance in treatment.

Etiologic Background.—Although tuberculosis of the breast is usually secondary to a primary lesion elsewhere, there can be no doubt that it does occur as a primary condition. Primary tuberculosis may be due in some cases to a local infection, but it is probably more often caused by a blood-borne invasion by the tubercle bacillus. It is more prevalent in the female than in the male and in glands which have been or are physiologically active, and in the majority of cases it is unilateral. The predilection of the bacillus for certain parts of the body is more difficult to explain. The late Prof. Sir William Macewan[4] held strongly to a theory that most persons carry the germs of tuberculosis which are ever ready to settle when the natural immunity of the subject is sufficiently lowered and a suitable nidus is provided. There appears to be general agreement that its development is influenced by age, sex, marital status, hereditary tendencies and antecedent mastitis.

No other focus of tuberculosis could be demonstrated in the case now under review, which appeared, therefore, to be a case of primary infection of a breast which had been the seat of injury. The trauma produced a circumscribed hemorrhage which formed a suitable nidus for the bacillus, with consequent abscess formation.

Signs, Symptoms and Diagnosis.—As Shields[5] has stated, "Many of -
tients have a fair skin and
In cases of the advanced con
may be marked loss of
developed anemia,

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**Warden, St John Foundation Hospital.

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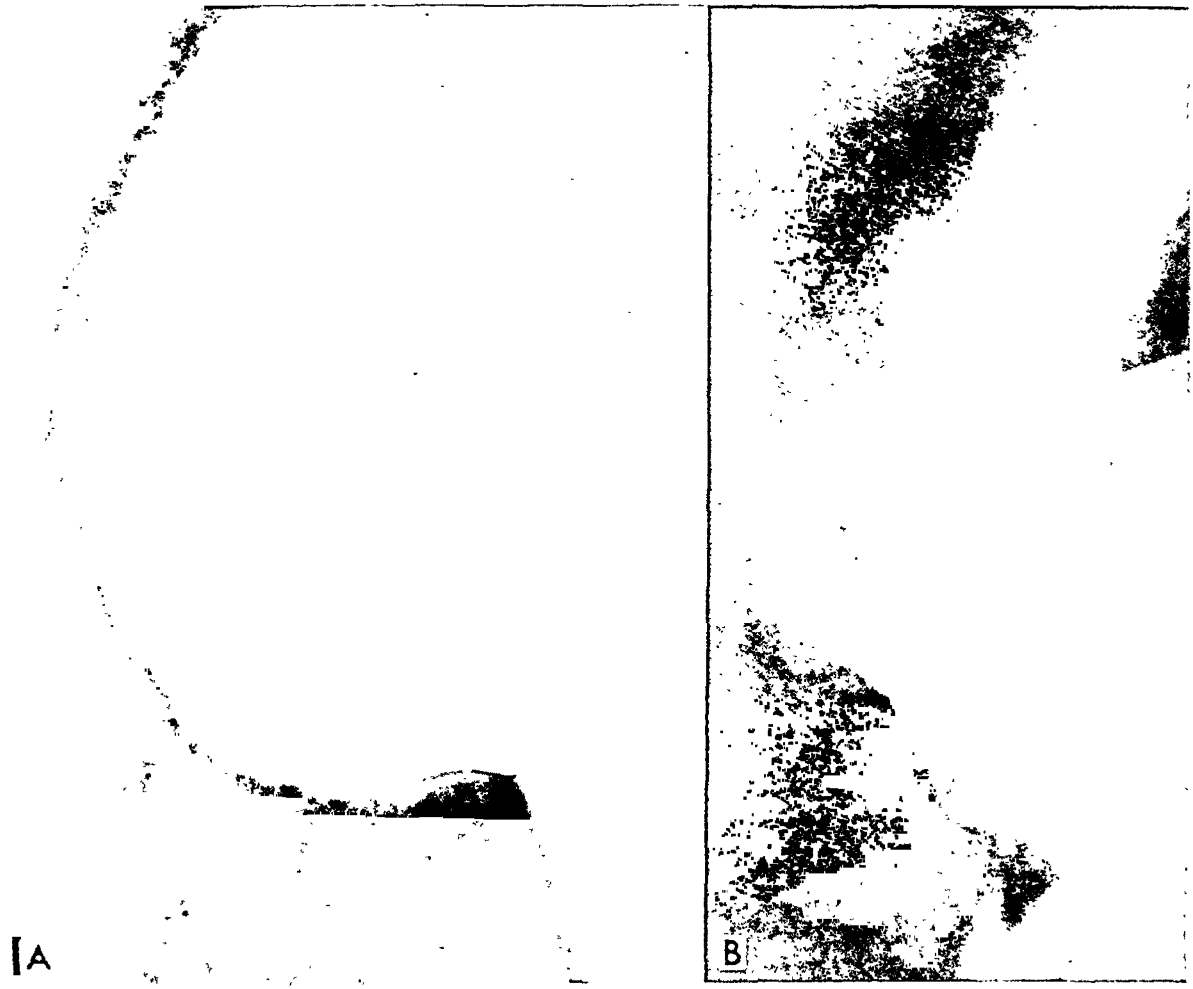

Fig. 1.—*A*, left mammary gland, normal, illustrating Cheatle's mammary arc. *B*, right mammary gland, showing broken mammary arc, an area of caseation and an intact basement membrane.

in excellent general health.

In the early stages a localized swelling of variable size may make its appearance. A break in the normal mammary arc (Cheatle's sign) may be the only apparent departure from the normal. Frequently there may be slight retraction of the nipple, accompanied or unaccompanied by a discharge. In some cases a dusky red hue may be noticed in the overlying skin, which may become thickened, glazed and shining —not unlike the condition presented by an advanced carcinoma. When the condition becomes generalized in the gland the swelling may burst and give rise to discharging sinuses. The associated lymphatic glands may or may not show involvement.

The patient's attention is often drawn to the condition by a painless lump or a general hardening and tenderness or possibly merely by a vague, indefinite and recurrent pain. Pain, however, is not usually a prominent symptom.

The swelling is usually fixed in relation to the substance of the gland, which itself remains freely mobile. The swelling is indefinite in outline and surrounded by marked induration of the adjacent tissues. Fluctuation may be present in advanced stages, and occasionally the supraclavicular and cervical glands may be extensively involved.

Pyogenic infection, neoplasia and trauma (hematoma) are the three commonest causes of tumor of the breast. Other causes are tuberculosis, syphilis, plasma cell mastitis, actinomycosis and Hodgkin's disease, but these are relatively rare. The differential diagnosis is best considered under the following heads:

Clinical: Age, sex, marital state and the presence or absence of lactation are important factors. The history of a previous abscess or discharging sinus in a patient between the ages of 20 and 40 suggests tuberculosis. In these cases the normal mammary arc is broken.

Transillumination: In the presence of tuberculosis the gland generally presents the appearance of lessened translucency, while the focus appears as a localized area of almost complete opacity and indefinite contour (Moore[6]).

Roentgen Study: Roentgenograms show, in the case of the tuberculous breast, a deficiency of glandular tissue, but with intact striae and a relatively localized mass. The presence of sinuses, calcified areas or caseation is almost pathognomonic. In contradistinction, the breast with malignant disease shows destruction of the striae, a less dense opacity and a mass, in many instances, appearing to extend beyond the confines of the gland (Lee and Floyd[7]).

Pathologic Picture: Microscopic examination of a discharge may reveal the tubercle bacillus, or the discharge may be injected into guinea pigs. A Wassermann test should be done to exclude syphilis. Sections obtained for biopsy will, in most cases, demonstrate the true nature of the

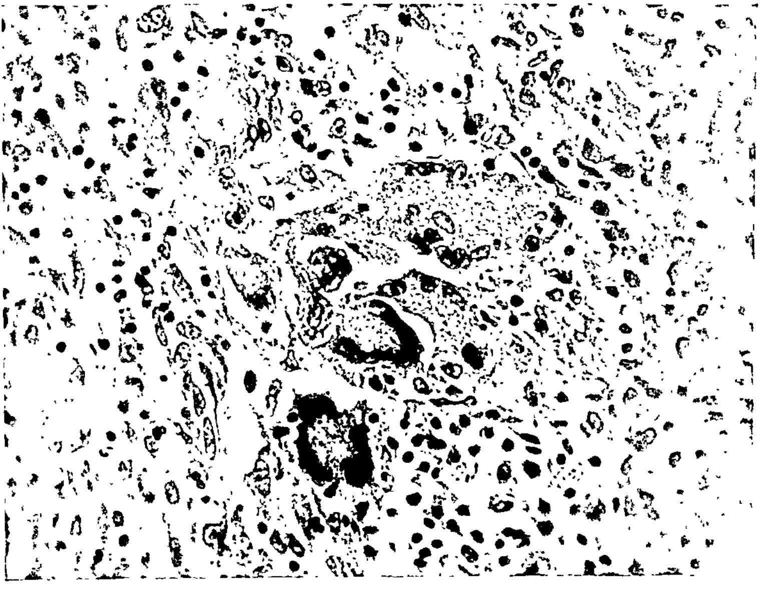

Fig. 2.—Section showing giant cells, with peripherally arranged nuclei, and leukocyte

mass. Since biopsy was introduced by Ruge and Veit[8] of Berlin, its practice has never been regarded as without danger. According to Cheatle and Cutler,[9] a diagnosis of cancer should be made only by the examination of paraffin sections, for the clumping of cells in a frozen one may suggest malignancy.

REPORT OF CASE

Mrs. W., a woman aged 29, with no history of previous illness beyond the usual diseases of childhood, had been married at the age of 19. In 1943, while working, she was struck on the upper and outer part of the right breast by the handle of a machine. This part swelled, and the skin over the swelling became markedly discolored. The bruise was treated with hot fomentations, and the pain became less during the ensuing week. Almost a month later a swelling appeared which, after incision, continued to discharge for several weeks.

In 1945, the patient bore a child. Three months later another swelling was incised. In all, from the date of the first incision until her examination by us in 1948, the breast had been incised nine times. The patient did not nurse her child. Her general health was stated to have remained more or less normal. No history could be elicited of any case of tuberculosis in her family.

General Examination.—The patient was of medium height and normal weight. The right breast was smaller than the left, with the nipple slightly retracted and lying just above Upcot's line.[10] The normal mammary arc was defective. At the upper border of the nipple there was a discharging sinus. A mass was present, located in the lower half of the upper and outer quadrant and involving the nipple. It was firm and hard, but with a certain degree of elasticity, particularly in its center. Its limits were indefinite, and, although it was fixed to the glandular tissue, the gland as a whole was freely mobile on the underlying parts. There was a suspicion of fluctuation in parts. The plateau test of Jackson and Severence[11] gave negative results. The axilla was normal, and there was no suggestion of any involvement of the axillary or supraclavicular or of the inguinal glands. Clinical examination of the thoracic and abdominal cavities revealed no abnormalities.

Transillumination. — The left breast was normal. The right showed marked generalized opacity, most pronounced in the upper and outer quadrant. In this situation an area of almost complete opacity corresponded with the mass clinically palpated. The opacity, which was more marked than is usual in cases of carcinoma, suggested that caseation or calcification might be present. There was no suggestion of extension of the tumor toward the thoracic wall, and the axillary space appeared normal.

Roentgen Examination.—The mammary arc was altered. The break in continuity of the epidermal line was clearly illustrated, and the deficiency of the glandular tissue was indicated by the degree of translucency of the films. The fibrous tissue was mainly concentrated at the base of the gland in one mass, the alveolar spaces being largely obliterated owing to the clumping together of the striae. Such striae as were recognizable were irregular but in no part ruptured or invaded by cells. At the base of the mass two white opaque areas were seen, approximately ⅛ and ¼ of an inch (0.3 and 0.6 cm.) in diameter, which strongly suggested the presence of caseation.

Figure 1 shows the left breast with normal roentgenographic characteristics.

Figure 2, a view of the right mammary gland, demonstrates the broken mammary arc and the deficiency and alteration in disposition and consistency of the glandular tissue. It also shows the rearrangement of the fibrous tissue, the two caseated areas at the base and the intact basement membrane, which helps to distinguish it from a malignant condition.

Hematologic Picture.—Apart from a slight degree of anemia and slight lymphocytosis, the blood picture was normal. The Wassermann and Kahn reactions were negative.

Biologic. — Some discharge obtained from the discharging sinus was injected into the anterior chamber of the eyes of a mouse and a guinea pig. The results were negative. Inoculation of a guinea pig, which was killed at the end of six weeks, also produced a negative result, although two enlarged mesenteric glands were suggestive of tubercles.

Diagnosis.—Syphilis, actinomycosis, plasma cell mastitis and subacute mastitis were regarded as definitely eliminated, and the diagnosis lay between tuberculosis and carcinoma or both. The appearance of the swelling developing within six months of an injury prevented absolute elimination of carcinoma, but tuberculosis seemed to be the more likely, for several reasons. The factors markedly in favor of tuberculosis were the patient's age, the appearance of the sinus, the consistency of the mass, the absence of glandular involvement, the mobility of the breast on the underlying tissues, the length of time the swelling had been present, the appearance on transillumination and, roentgenographically, the intact basement membrane. The results of biologic tests were regarded as negative for malignant change but suggestive of tuberculosis. In these circumstances a mastectomy was advised and carried out in the Order of St. John Foundation Hospital.

Difficulties in arriving at a preoperative diagnosis have been emphasized by Hinton and Lawson,[12] who reported 1 case in which they made a preoperative diagnosis of carcinoma, but the lesion proved on section to be tubercular; the axillary gland was involved. They reviewed 9 other cases of mammary tuberculosis, but the preoperative diagnosis was confirmed in only 3.

Operation (Electrosurgical Mastectomy).—The electrosurgical technic has been described in detail in several of our published papers (Moore, W. J.[13]). By this method a mastectomy was carried out, all tissues being removed down to the fascia of the pectoralis major.

The gland was removed from the midline outward, for by this technic the possibility of displacing cells or fluids into the retrosternal lymphatic chain is markedly reduced. Use was made of the transverse incision, and the tubular needle was employed for the placing of the sutures.

Advantages of Special Methods.—Electrosurgery: In comparison with operation by scalpel, the electrosurgical method has many advantages. The incisions are made with greater rapidity and with less trauma to the tissues. Parenchymatous and venous hemorrhage is instantaneously controlled, with all the advantages of working in a relatively dry wound free from buried catgut. Nerve endings are insulated by the coagulation of their sheaths, so that shock is lessened and the development of neuromas eliminated. Histologic fixation of the tissues completely obstructs cellular and fluid dissemination and so reduces the incidence of local or remote recurrence. A deposit of protein, due to oxidation, on the wound edges prevents inflammation and conserves the tissue fluids, with the consequent avoidance of dehydration. The technic also results in a good scar, which becomes less prominent with age and in which keloid does not develop.

With the avoidance of dehydration, shock and postoperative pain and discomfort, normal physiologic functions are more rapidly restored; the patient enjoys the freedom of the bed and experiences a sense of well-being.

The Transverse Incision: The principle of the transverse incision is claimed to be anatomically, physiologically, histologically, mechanically, surgically and aesthetically sound. The free exposure of the parts eliminates the need of prolonged retraction, with its consequent trauma of the wound edges. These edges lie naturally in approximation, so that relaxation incisions and tension sutures are not required. Fibers cut at right angles to the long axis heal more rapidly and produce a stronger and neater scar. In the case of the breast there is less liability to edema of the arm, and the patient enjoys from the beginning a greater freedom of movement.

The Tubular Needle: Otto-Saphir[14] and Trosorelli[15] have shown that cells may be, and often are, deposited in needle tracts. The tubular needle avoids this complication by enabling the sutures to be placed without contact with the tissues, while the needle tract is sealed by bringing the handle of the needle into contact with the active electrode (Moore, W. J.[16]).

Artificial Mammary Gland: Artificial breasts are now being extensively advertised in many journals. They have an aesthetic and physiologic value, imparting a normal contour to the wearer and so saving her from an inferiority complex. It is essential that the postoperative scar, especially when the gland has been removed on account of malignant disease, be protected from injury or irritation.

Pathologic Picture.—The gross pathologic appearance of the amputated [illegible] proved the clinical conclusions [illegible] rect. The view that there [illegible] of caseation at the base of the gland was upheld. Histologically the clinical, transilluminative and radiological observations were confirmed (Fig. 3). The section showed groups of giant cells with the characteristic peripheral nuclear distribution.

SUMMARY AND CONCLUSIONS

A case of tuberculosis of the mammary gland, a somewhat rare disease, is reported, in which the correct diagnosis was made preoperatively. Deaver and McFarland,[17] in their textbook *Diseases of the Breast*, offered a comprehensive review of tuberculosis of the mammary gland. They cited a case reported by Marmangonia,[18] which is, in many respects, similar to the one reported in this paper. In both an injury was the determining factor. The exacerbation coincident with lactation is interesting.

As to aids in arriving at a preoperative diagnosis, it is the author's opinion that transillumination and radiologic procedures are of great practical benefit. Biologic tests have proved useful. Although the guinea pig test has been practiced successfully for many years in the diagnosis of tuberculosis, the implantation of tissue into the anterior chamber of the eye of a rodent is still in the experimental stage. The present case supports the statement of Greene[19] that only malignant and embryonic tissue will grow in the anterior chamber of the eye. This test may yet prove valuable.

Apparently no record is available with regard to the result of injection of discharge from an ulcer or a sinus into the anterior chamber of the eye of a guinea pig, rabbit or mouse. It was decided to perform the experiment in this case; though not conclusive evidence, the negative result was in keeping with the nonmalignant condition.

An electrosurgical technic was employed in the mastectomy. Its great advantage over the more orthodox scalpel technic in a case of this kind lies in its power to prevent local recurrence, especially in the postoperative scar; in its hemostatic action, and in its sealing of the tissue spaces, which eliminates the danger of dissemination and the opportunity for formation of a nidus to foster further infection. The subsequent history of the patient in the present case has confirmed these advantages.

Author's Note: We take pleasure in recording our thanks to Prof. J. W. Emslie, Head of the Department of Veterinary Pathology, University of Glasgow Veterinary School, for his advice and help and for placing the resources of his department at the disposal of the senior writer, who carried out the experimental part of this work. We also thank Mr. James for making the photographs of the roentgenograms.

RÉSUMÈ

L'auteur rapporte un cas rare de tuberculose de la glande mammaire dont le diagnostic avait été fait avant l'intervention. Les auteurs Deaver et McFarland en font l'exposé complet dans leur livre intitulé: "Maladie du sein." Le cas qu'ils citent, celui de Marmangonia, est semblable par certains aspects à celui de l'auteur. La cause en fut un traumatisme et l'exacerbation survenue durant la lactation. Comme moyens utiles de diagnostic, l'auteur recommande la trans-illumination et la radiographie, la biopsie et l'inoculation au cobaye. Un nouveau test est celui de l'implantation du tissu dans la chambre antérieure de l'oeil d'un rongeur. Seul les tissus d'origine maligne y poussent. Considérations sur la technique d'implantation.

La mastectomie fut faite à l'électrocautère; ce procédé est plus avantageux pour la patiente.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Es wird ein Fall von Tuberkulose der Brustdrüse, eine ziemlich seltene Erkrankung, berichtet, in dem die richtige Diagnose vor der Operation gestellt worden

war. Deaver und McFarland widmen in ihrem Lehrbuch der Erkrankungen der Brustdrüse der Tuberkulose eine umfassende Besprechung. Sie zitieren einen von Marmangonia berichteten Fall, der in vieler Hinsicht dem in dieser Arbeit vorgestellten ähnelt. Bei beiden Kranken spielte eine Verletzung eine entscheidende Rolle. Von Interesse ist das zeitliche Zusammentreffen des Aufflackerns der Erkrankung mit der Stillperiode.

Was die Hilfsmittel zur Stellung einer praeoperativen Diagnose angeht, so hält der Verfasser die Transillumination und das Roentgenverfahren für äusserst praktisch und aufschlussreich. Auch biologische Proben haben sich als wertvoll erwiesen. Der Meerschweinchenversuch wird zwar seit vielen Jahren in der Diagnose der Tuberkulose erfolgreich angewandt, aber die Einpflanzung von Gewebe in die vordere Augenkammer des Nagetiers befindet sich noch immer im experimentellen Stadium. Der vorliegende Fall bestätigt Greenes Feststellung, dass nur bösartiges und embryonales Gewebe in der vorderen Augenkammer wächst. Immerhin mag sich dieser Versuch noch als wertvoll herausstellen.

Allem Anschein nach liegen keine Berichte ueber den Ausgang von Einspritzungen Ver Absonderungen aus einem Geschwür oder Sinus in die vordere Augenkammer des Meerschweinchens, des Kaninchens oder der Maus vor. Im vorliegenden Falle entschloss man sich, den Versuch durchzuführen; sein negativer Ausgang liess zwar keine endgültigen Schlüsse zu, stand aber doch im Einklang mit der Annahme einer nicht bösartigen Erkrankung.

Zur Mastektomie wurde ein elektrochirurgisches Verfahren angewandt. Der grosse Vorzug dieser Methode gegenüber der konventionelleren Skalpelltechnik liegt bei dieser Art von Fallen in der Möglichkeit der Vorbeugung örtlicher Rückfälle besonders innerhalb der Operationsnarbe; weitere Vorteile werden in der haemostatischen Wirkung dieser Technik und in ihrer Fähigkeit, die Gewebsspalten fest abzuschliessen, gesehen, wodurch die Gefahr der Ausbreitung und die Möglichkeit einer Herdbildung für spätere Infektionen ausgeschaltet werden. Diese Erwartungen werden durch den Krankheitsverlauf im vorliegenden Falle bestätigt.

RESUMEN Y CONCLUSIONES

Se comunica un caso de tuberculosis de la glándula mamaria, enfermedad un tanto rara, en el cual el diagnóstico correcto fué hecho preoperatoriamente. Deaver y McFarland,[17] en su libro *Diseases of the Breast* exponen una revisión amplia sobre tuberculosis de la glándula mamaria; citan el caso comunicado por Marmangonia[18] semejante en muchos aspectos al comunicado en este artículo. En ambos el factor determiante fué un trauma. Las exacerbaciones presentes con la lactancia son interesantes.

En relación a los elementos para llegar al diagnóstico preoperatorio, la opinión del autor es que la transiluminación y los procedimientos radiológicos son de gran ayuda práctica. Las pruebas biológicas han probado ser útiles. Aun cuando la prueba con conejillo de indias ha sido practicada con éxito durante muchos años en el diagnóstico de la tuberculosis, la implantación de tejido a la cámara anterior del ojo de un roedor permanece aún en estadio experimental. El caso presente apoya el postulado de Greene[19] de que solamente el tejido maligno y embriológico puede desarrollarse en la cámara del ojo. Sin embargo esta prueba puede ser todavía de valor.

Aparentemente no hay referencia con relación al resultado de la inyección de la secreción de una úlcera ó un seno, en la cámara anterior del ojo del conejillo de indias, conejo ó ratón. En este caso se decidió hacer la experiencia; aun cuando no hubo evidencia conclusiva, el resultado negativo fué en relación con el padecimiento no maligno.

En la mastectomía se usó una técnica electroquirúrgica, que tiene grandes ventajas sobre el escalpelo ortodoxo en un caso

de esta naturaleza por su poder en la prevención de recidiva local, especialmente en la cicatriz postoperatoria; su acción hemostática y en su sellamiento de los espacios tisulares, que elimina el peligro de la diseminación y la oportunidad para la formación de un foco propicio para la infección. La historia del paciente en el caso presente ha confirmado estas ventajas.

SUMARIO E CONCLUSOES

Relata o autôr um caso de tuberculose da glandula mamaria,—doença um tanto ou quanto rara,—no qual o diagnostico preoperatório foi feito com exatidão. Salienta haverem Deaver e Mc Farland, em seu livro "Doenças do Seio" fornecido um estudo compreenssivo da tuberculose da mama. Citam um caso registrado por Marmangonia que era, em muitos aspétos, semelhante ao que é nêste trabalho relatado. Em ambos uma lesão foi o fatôr determinante, e a sua exacerbação, coincidindo com a lactação, é interessante.

Salienta Moore que a transiluminação e os processos radiologicos são de grande valôr para o estabelecimento de um diagnostico pre-operatório, revelando — se ainda uteis os téstes biologicos, o mesmo sucedendo a outras provas utilizadas no diagnostico da tuberculose.

Discute o comportamento do caso em téla frente as diferentes provas experimentais a que foi submetido, salientando o valôr de cada téste.

Foi procedida a mastectomia pela electro-cirurgia, que é pelo autôr realçada com entusiasmo, detalhando todas as suas vantagens, especialmente aquelas referentes à cicatrisação, prevenção de recidiva local, infecção e hemostase perfeita e segura.

Conclue o seu trabalho afirmando que a historia subsequente da paciente veio confirmar todas as vantagens do metodo usado.

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Surgeons' Hall of Fame

A PROGRESS REPORT

Response to the creation of a Surgeons' Hall of Fame at the Home of the International College of Surgeons in Chicago has been world-wide and more than enthusiastic. Apparently the need for such a permanent memorial has been widely felt. The College is deeply gratified by this fine response. Our friends and colleagues here and in all other nations may rest assured that nothing will be left undone to make the reality as satisfying as the dream.

Committee on Arrangements
for the
International Surgeons' Hall of Fame

Plans and arrangements for the Surgeons' Hall of Fame are actively in progress. The Committee is as follows:

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The rules and regulations adopted, as well as the criteria for admission and the details of procedure and protocol, will be announced in the near future.

Traumatic Cataract Surgery in Children

Needle-Hook Technic

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I BEGIN this article by making a plea for earlier attention to surgical consideration of cataract resulting from injuries to children and young adults. We frequently encounter patients with a history of a blow or a penetrating corneal wound from which partial or total loss of vision has occurred. These patients usually state that they visited a physician until the traumatic inflammation cleared, and then accepted the final blind eye situation as "just too bad" but inevitable. The tendency of the laity and many members of the medical profession has been to accept the situation philosophically and in effect to say to these patients, "You are lucky that the accident involved only one eye and that you have a good one remaining." They know that the child will never have two perfect eyes again, i. e., with binocular vision.

As an ophthalmologist, whose first precept should be conservation of vision, one should analyze every such case and advise the patient for future maintenance of maximum visual function. What is often not considered is whether partial vision can be salvaged in the injured eye. Even though binocular vision cannot be reestablished, partial vision is better than none. The child can have a quiet part-seeing eye as insurance against total blindness should accident or diseases ever affect the other eye. A quiet part-seeing eye is also much less apt to cause sympathetic ophthalmia.

It is highly important, therefore, that salvage operations be performed early, while the retina still retains good function and before secondary glaucoma occurs or atrophy and softening set in. This sentence contains the main thought of this presentation.

Frequently, it is not even advisable to wait until all traumatic inflammation has subsided, especially if synechiae exist. Many eyes do not long tolerate having the anterior chamber sealed off from the posterior chamber without showing incipient deterioration. As soon as the corneal wound is well closed, the lens substance is removed[1] by the Wolfe double suction cannula technic (Figs. 1 and 2). The keratome incision for this should be at the limbus, as far away from the wound as possible. Iridectomy is advisable if the pupil is small or synechiae are present and preventing dilatation. The better the pupil is preserved, the fewer synechiae are present and the smaller the amount of iris tissue lost, the better the prognosis. A part-seeing eye is also less apt to become a sympathetic nerve irritant to the remaining good eye.

The consequence of any penetrating ocular injury is usually cataract, although contusion without actual penetration may also cause cataract.

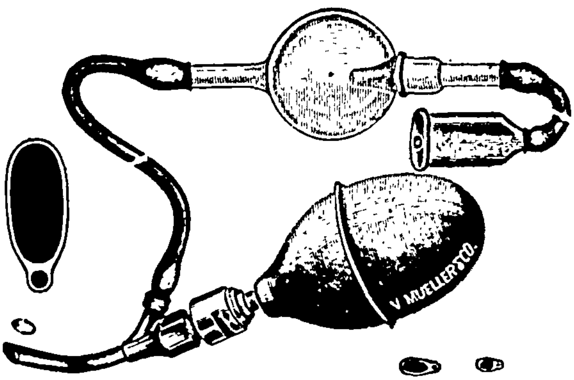

Fig. 1.—Wolfe apparatus for soft cataract. After discission of anterior capsule the double-barreled cannula is inserted into the anterior chamber through a small keratome incision. Mouth suction draws lens into glass trap. Fluid is injected from rubber bulb, accomplishing lavage and suction simultaneously.

From the Eye Department, Deaconess Hospital, Marshalltown.
Submitted for publication Feb. 15, 1953.

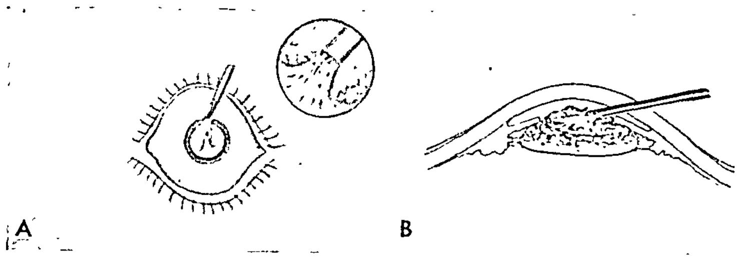

Fig. 2.—*A*, double cannula in anterior chamber, soft lens substance being sucked into larger tube. Insert demonstrates suction into glass trap. *B*, fluid injected into anterior chamber. Accomplishes lavage and suction extraction of soft cataract.

Briefly, the following syndromes are typical: *First*, a total cataract may develop, rapidly or slowly, in the contused eye. Penetrating corneal wounds affecting the lens capsule may heal over, but the lens will sooner or later become cataractous. The description of the mechanisms involved in this process require too much detail to be covered in a paper devoted largely to the surgical phase. *Second*, the eye may remain chronically inflamed and show continuing inflammation, from which a secondary glaucoma may result. *Third*, the inflammation, as a result of trauma to the uveal tract or the presence of blood in the vitreous, may be followed by hypotony and atrophy. *Fourth*, rupture or penetration of the lens capsule may result in partial or complete absorption of the lens substance, with exudates, adhesions and scar tissue formation as a result of the trauma and inflammation. If the pupil has not been kept well dilated, this is a serious condition and the one for which I would particularly urge early surgical consideration. One is then confronted with a secondary or membranous cataract, the condition most frequently observed after penetrating injuries. *Fifth*, sympathetic inflammation may involve the other eye; this is the most serious complication and the greatest danger. *Sixth*, detachment of the retina and pathologic vitreous may be present.

The danger associated with the fifth and sixth points has possibly been overemphasized. It is pertinent, but in my opinion many eyes have been removed that might have been saved by early salvage operations as herein described.

The complications and traumatic end results are so varied and numerous that they are mentioned only in the foregoing six points. I shall discuss the main types of cases that are encountered at this clinic. They are chiefly the ones in which the inflammation has subsided.

The basic principles that concern the ophthalmologist and should be kept uppermost in his analysis of the case are, first, to not let one poor eye ruin the good eye. This is logical, but neglect of it has caused many eyes to be removed that might have been saved for partial visual function. Of course, if the injured eye cannot be freed of ciliary inflammation and become a quiet eye, enucleation must be considered. The younger the patient the more applicable is this statement, although I have seen only a few persons with true sympathetic ophthalmia resulting from old injuries. Such ophthalmia does occur, however, and is an ever-present danger that cannot be safely discounted.

If the injured eye is to be retained, an effort should be made early to restore it, first to obtain a seeing eye if possible and at least a quiet eye. Unless circulatio
restored between the anterior and po
or chambers, the eye will sooner or
deteriorate and [illegible] er a seein
nor a safe qu

Traumatic conditions of the eye may be thus classified for a new surgical procedure not heretofore described:

A. Total cataract with the capsule intact.
B. Rupture of the capsule with all or part of the lens absorbed.
C. Iris adhesions, exudate and a membranous cataract.

Class A.—For children and young adults with total cataract, thorough examination (particularly slit lamp analysis) is advised, to determine whether the lens substance is still soft. If the lens is soft or semisoft, the Wolfe double-barreled cannula suction technic[1] (Fig. 1) is indicated; it enables the surgeon to remove the cataract by a minor surgical procedure with minimal danger of further trauma to the uvea. If the retina is undamaged, a fair to good prognosis can be made. In such a case, the Wolfe suction technic can be as effective for traumatic as for congenital cataract.[1] In cases of congenital cataract the percentage of favorable results has been raised into the 90 per cent bracket, as compared to about 50 per cent with the old needling method. If the lens is not soft, the capsule is intact and no synechiae exist. Some intracapsular technic (preferably the Barraquer) is considered.

Classes B and C.—It is to these groups that special attention should be directed. A surgical procedure I have used for many years, with highly satisfactory results, is here presented.

It is often a difficult matter for the ophthalmic surgeon to restore circulation between the anterior and posterior chambers of an old injured eye, because the lens capsule has been ruptured and part of the lens absorbed, leaving a shallow anterior chamber with adhesions and synechiae. Exudate and scar tissue have formed in the remains of the anterior capsule, with adhesions to the iris or cornea, and are present in various stages. If the lens has been partly absorbed, a heavy sclerotic posterior membranous cataract may exist, and a regular needling will not suffice. It is difficult to determine what is capsule and what is exudate. If the iris is incarcerated with no functioning pupil, the Zeigler knife through-and-through technic has shown some good results, but in many cases neither of these technics is adequate. The Wolfe cycle-shaped knife needle technic (first step), here illustrated, is efficient and may be adequate if the membrane is thin (Fig. 3*A*).

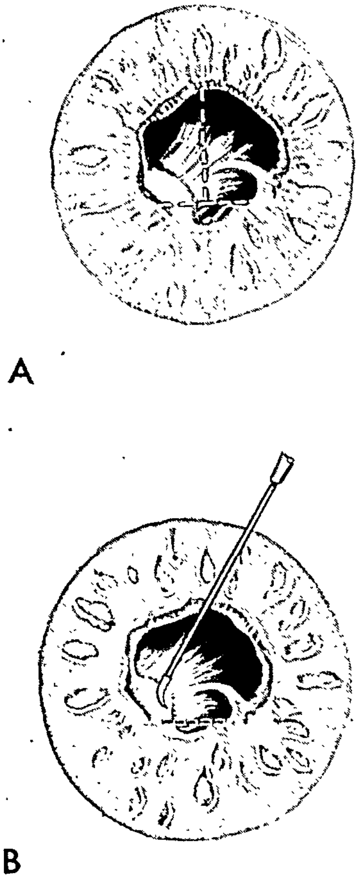

Fig. 3.—*A*, Wolfe cycle-shaped knife needle is passed through cornea at 12 o'clock. The cut should follow the dotted first horizontal 3 to 9 o'clock. In the second step it is swept upward from 6 to 12 o'clock. If a good central opening results, the operation is here terminated. *B*, situation in which the upward cut by Wolfe knife is not sufficient and the resulting opening is not central or adequate. The second stage of the procedure is then performed with the blunt hook.

If occlusion or seclusion of the pupil

exists, surgical measures should be quickly employed, as frequently the eye deteriorates and softens rapidly, the prognosis becoming progressively poorer. These conditions are generally difficult to handle and of varying degree. Complications, particularly hemorrhages, are frequently encountered, making the surgical procedure more intricate. If operation is employed in a case in which the condition is highly complicated, the patient should be told that it is a salvage operation, with everything to gain and nothing to lose. A defeatist attitude on the part of both surgeon and patient is often encountered and is not justified. The patient, parents or family should be fully acquainted with the facts and willing to chance a salvage operation.

Surgical Technic.—I herewith submit a planned surgical technic that may be partially or wholly employed. It has been very satisfactory in cases of Class B and Class C. I have used this combined knife-needle-hook procedure for many years and found it adequate in most cases. It is a comparatively simple procedure, and it frequently saves the surgeon from subsequent needlings or major surgical procedures. The surgeon should plan the entire procedure. It may be utilized only partly (Fig. 3*B*) should the capsule prove to be one that can easily be opened without strands of capsule remaining in the center of the pupil.

For young patients (without increased tension) the procedure is as follows: The curved knife needle is introduced at the limbus (Fig. 3*A*). The knife needle point is then jabbed through the membrane as low as possible and turned to cut from 3 to 9 o'clock to open and release the membrane below. The second action is to slit the membrane from 6 to 12 o'clock, using a positive sweep of the knife from below upward (Fig. 3*B*). Here the curved knife needle will sever many membranes where the straight one will not. If a good opening results, the operation is terminated. Sometimes, instead of cutting, the membrane stretches or tears and does not clear the middle of the pupil. The surgeon keeps this in mind, and if the membrane cannot be severed satisfactorily the knife needle is used to enlarge the corneal incision as it is withdrawn, making about a 2.5 to a 3 mm. opening. The Wolfe blunt hook is then introduced, and the membrane is caught below and withdrawn wholly or cut

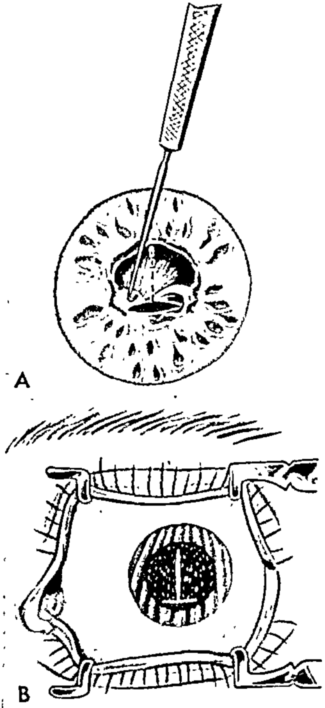

Fig. 4.—*A*, Wolfe curved knife in anterior chamber, through limbal incision. First cut is made as low along dotted line as possible. Then knife is turned with tip pointed back and an upward sweeping cut is made. *B*, opening in capsule to be desired; if obtained with Wolfe knife, first step is adequate for visual function, as capsule will shrink further.

off if prolapse of the iris occurs (Figs. 4*A* and 5*A*). If the membrane slips or is difficult to engage, the hook is turned and twisted, and this will usually hold the partly severed membrane that might otherwise slip away (Fig. 5*B*). If a corneal adhesion is present and the iris strand is far enough away from the periphery to allow the point of the curved knife to catch it without traumatizing the cornea, we sever it (Fig. 4*A*). Under these circumstances I use the highly curved cycleshaped needle (Fig. 3*B*).

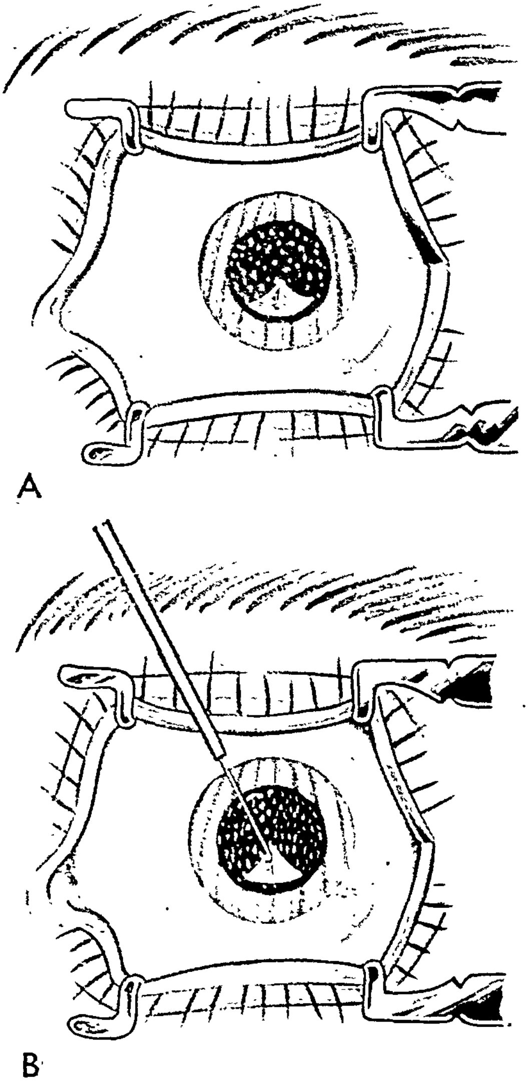

Fig. 5.—*A*, author's blunt hook introduced through corneal incision. Hook catches membrane and is drawn up, tearing it or drawing it out through corneal incision. *B*, hook catching upper margin of an inadequate opening from knife incision of tough membrane. Hook breaks it or draws it out through the corneal incision.

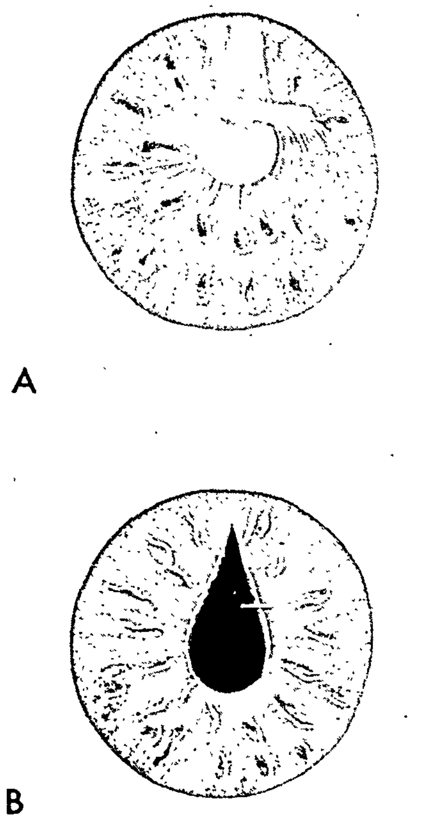

Fig. 6.—*A*, case of A. H., a 5-year-old girl. Icepick penetrated cornea at site of scar. Total cataract with iris adhered to cornea. Very disfiguring. Light perception only. *B*, final result of operation for totally blinding traumatic cataract. Patient has 20/30 (90 per cent) vision and an excellent cosmetic result.

There is very little reaction, and a clear black pupil is usually obtained, permitting early fundus examination. If there is any question as to whether the membrane is adequately severed, the Hildreth fluorescent lamp is used before the needle is withdrawn.

The technic is an outgrowth or continuation of a method of iris and capsule incarceration that has been employed in this clinic for twenty years in cases of secondary glaucoma. It is used for incarceration of capsule, or iris, which acts as a seton to allow external drainage for secondary glaucoma following extracapsular cataract operations. The incarcerated capsule does not absorb, but gives continual subconjunctival drainage. This technic was reported in the *American Journal of Ophthalmology*.[2] The use of the blunt hook was fully described, and its employment for external drainage is still recommended. Mechanically it is essentially the same, except that a keratome incision is made under a conjunctival flap.

REPORT OF CASES

CASE 1.—A. H., aged 5, of California, was referred to this clinic by her uncle, an unusually competent optometrist. Several months before she came to us she was punching a hole in a doll's shoe with an icepick, which slipped and penetrated the left cornea. An ophthalmologist treated the eye, keeping it dilated for several weeks. *The child had little pain and* only a small amount of inflammation, but after the inflammation had subsided it was discovered that she could see very little. The parents consulted several ophthalmologists, most of whom offered no solution to the problem, and one of whom told them that eventually the eye would have to be enucleated.

The patient was an unusually beautiful child except for the easily apparent white lens opacity. She was well nourished and had made normal progress in school. She had a high intelligence quotient. Examination showed the right eye to be normal, but with the left eye she was able to demonstrate only finger motion on the temporal side with good light projection. Objective examination revealed a very small pupil, completely immobile, with a corneal scar just above and to the right of center, and heavy iris adhesions to the corneal wound (*Fig. 6A*). *There was complete seclusion* of the pupil, with no reaction whatever to atropine. The lens capsule had been ruptured but had healed.

Three distinct surgical procedures were performed as outlined. The first step was severing of the iris strand that adhered to the cornea. Second, the iris was dissected free from the lens capsule, and this was followed by discission of the lens. The third and last step was aspiration of the lens substance by the Wolfe double cannula technic. Several pieces of calcareous lens nucleus required removal with forceps. The greatest postoperative problem was considerable hemorrhage from the blood vessels of the iris. The pupil was kept well dilated, the blood was gradually absorbed, and the iris was found free. The patient obtained 20/30 corrected vision after hyperemia resolved (Fig. 6*B*). Two years later the eye showed *a small thin cyclitic* membrane which may later require discission, but the patient still has 20/40+ vision. Fundus examination reveals no abnormalities. There is no deviation.

The most gratifying phase of the entire case, however, is the cosmetic result (Fig. 7). The eye continued soft for several days after the operation, but at the time of writing it

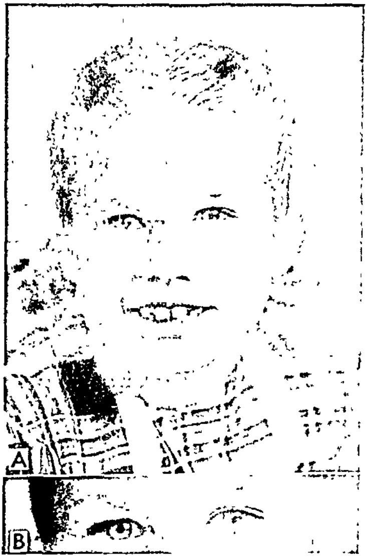

Fig. 7.—*A*, case of A. H. Note excellent cosmetic result one year after operation for traumatic cataract. *20/30 vision.* *B*, left eye after suction of cataract operation. Left eye looks normal except for slight irregularity of pupil. Corneal scar is shrunken so that it is scarcely visible.

intáta. Apresenta ainda um novo bisturí especializado para tratamento cirúrgico das cataratas secundarias ou membranosas. O me todo pode sêr usado, total ou parcialmente para eliminar qualquer membrana pupilar. São apresentadas inumeras ilustrações e historicos mostrando observações originais, e bem assim a recuperação visual posterior ao tratamento empregado pelo autôr.

RESUMEN Y CONCLUSIONES

Se aboga por la operación precoz para la prevención de la amblipía que se presenta tempranamente en los niños con catarata traumática. La técnica de lavado y succión del autor es usada para cataratas traumáticas suaves con cápsula intacta. Se expone una técnica nueva " bisturí, aguja y gancho" para catarata secundaria ó membranosa. Puede usarse parcialmente ó completamente para eliminar cualquier membrana pupilar. Se presentan varias ilustraciones e historias mostrando observaciones originales y rehabilitaciones visuales posteriores.

RÉSUMÈ

L'auteur insiste pour opérer les enfants présentant une cataracte traumatique afin de prévenir l'amblyopie. Le procédé de succion est recommande pour les cataractes molles avec une capsule intacte. L'auteur présente un nouvel instrument pour suturer les cataractes secondaires ou membraneuses. L'auteur illustre ses observations.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Der Verfasser erhebt einen breit angelegten Aufruf zur Frühoperation, um einer frühzeitig auftretenden Sehschwäche bei Kindern mit traumatischem Katarakt vorzubeugen. In Fällen von weichem traumatischen Katarakt bei intakter Kapsel verwendet er seine Spültechnik mit Hilfe der Ansaugung. Für sekundäre oder membranöse Katarakte gibt er eine neue Technik mit einem Messernadelhakena. Das Verfahren kann ganz oder teilweise zur Entfernung aller Pupillenmembrane angewandt werden. Verschiedene Abbildungen und Krankheitsgeschichten, die eigene Beobachtungen und die spätere Wiederherstellung der Sehkraft darlegen, sind beigefügt.

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Qualifying Examinations for Fellowship in the United States Section of the International College of Surgeons will be held on May 4 and 5, August 10 and 11, and November 2 and 3, 1953. The examinations will be given at the Cook County Graduate School of Medicine and the Cook County Hospital. Applicants are requested to address communications to Dr. Harry A. Oberhelman, Secretary, Examination and Qualification Council, 1516 Lake Shore Drive, Chicago 10, Ill.

Preserved Rib Cartilage

A Satisfactory Foreign Body Implant to Reconstruct the Microgenic Chin

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NEWARK, NEW JERSEY

IN recent years the literature has been replete with papers on various autogenous homologous and commercially manufactured inert foreign substances which have been employed to build out filling defects of facial contour. There is still a considerable divergence of opinion on which is the "ideal substance" to employ for this purpose. Every surgeon has shown preference for a favorite material and has achieved satisfactory results with it in particular situations. Paraffin, celluloid and ivory have been employed but generally have grown in disfavor and have been discarded. Dermis, derma-fat, derma-fat-fascia, mammary tissue, iliac crest, rib cartilage, meniscal cartilage, nasal osteocartilage, and nasal sepatal cartilage and bone are some of the many autogenous substances currently employed by many plastic and maxillofacial surgeons.

Until the advocation of preserved cartilage by O'Connor and Pierce,[1] autogenous rib cartilage, the crest of the ilium, the osteocartilaginous nasal hump, and septal cartilage and bone were and still are preferred by many surgeons to reconstruct receded chins. O'Connor and Pierce stated that, "After a five year waiting period we find that all of the refrigerated cartilage isografts that have been transplated have retained their original size and identity.' Peer[2] proved histologically that "dead cartilage grafts showed progressive invasion by fibrous tissue and partial absorption." This led many plastic and maxillofacial surgeons to discard preserved cartilage and stimulated a search for foreign substances which are inert, would be well tolerated by the tissues and would not be absorbed. Among those found and employed are tantalum, vitallium and polythene. These foreign substances are preferred by some surgeons and have been employed with satisfactory results.

The literature on all phases of plastic and maxillofacial surgery is voluminous. The articles thoroughly describe all types of functional and cosmetic deformities and means of correcting them. The literature is sadly deficient, however, on analysis of facial contour;[3] perhaps because the vagaries of facial contour are so great that it is almost impossible to estabish any chart of "norms" for practical use. Deformities of the chin are much more prevalent than one would assume from a perusal of the literature.

Patients with deformities of facial contour are no longer looked upon cynically when they desire improvement. The medical profession is no longer prejudiced against cosmetic plastic operations. We have come to realize that the mental anguish of some patients is so great as to cause complete disruption of the patient's social activities. Ridicule by unthinking persons aggravates the maladjustment. The strong relation between physical deformity and the state of the mind is now fully recognized. Persons so afflicted are deeply affected by their appearance and many bar themselves from normal social activities. They may become depressed and can develop what I choose to call a "facial contour neurosis." This psychoneurosis is a minor malady, which can be cured by a successful esthetic operation. The patient may be completely rehabilitated. If the neuropathic condition is neglected or inadequately treated it may slowly progress and develop into a true

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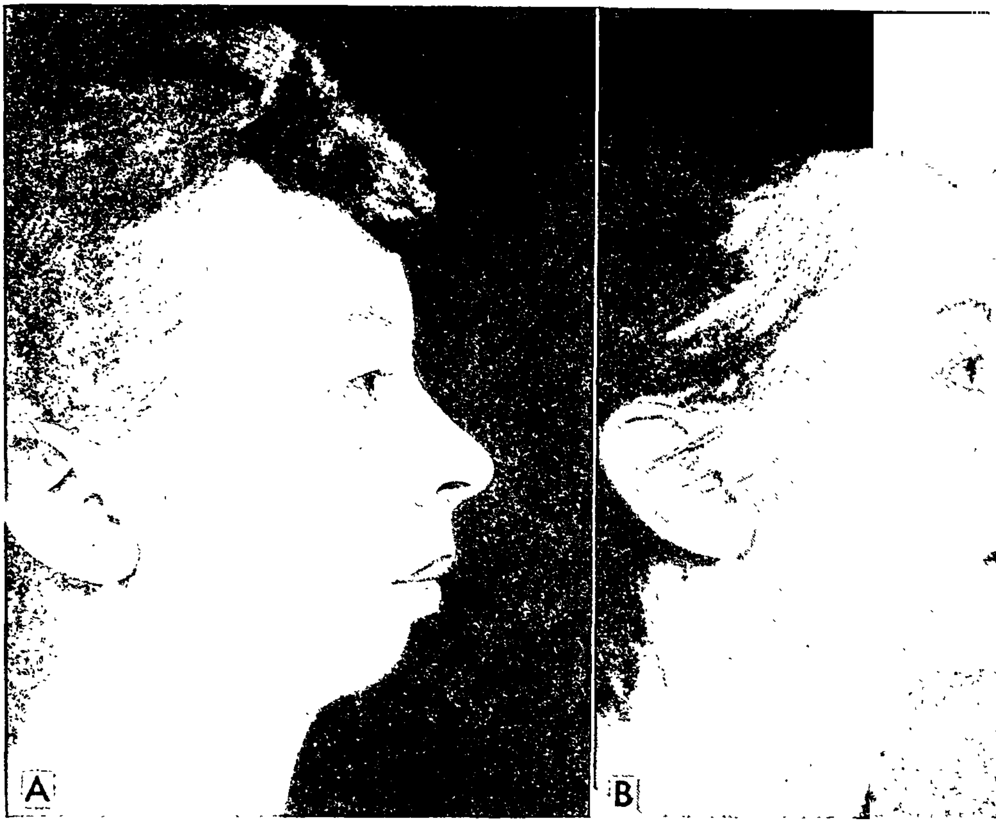

Fig. 1.—*A*, preoperative photograph. Second degree chin recession. Patient consulted surgeon for rhinoplasty, was unaware of chin deformity. *B*, postoperative photograph, showing result of pre-preserved cartilage chin implant.

psychosis; the schizophrenic "facial contour psychosis." The psychotic patient cannot be helped by a plastic operation. No matter how successful the operation may be, the psychotic patient always finds something to complain about and is never completely satisfied with the result obtained.

In the practice of maxillofacial surgery, it has been noted that some surgeons tend to consider the mildly receded chin unimportant consequently neglect it. Patients are not trained in facial analysis. Displeased with their facial appearance, most of them blame the nose for their deformity. Many suffer from a "nasal contour neurosis" and consult the plastic or maxillofacial surgeon for nasal correction. In most instances it has been found that the major facial deformity is not a deformity of the nose but rather of the chin (Fig. 1). A careful critical analysis is essential. At least 15 per cent of the patients examined were found to have concomitant nose and chin deformities (Figs. 2 and 3). A combined plastic procedure can correct the two deformities simultaneously.

A chin that is small creates the appearance of a longer (Fig. 4) or more prominent nose. It is for this reason that patients consult the plastic surgeon for rhinoplasty rather than a chin plastic. In those cases in which the upper teeth are "bucked" and the upper lip protrudes in advance of the lower, the chin appears to be receded but actually is not. The profile is not attractive. In such cases it is sometimes very difficult to determine whether or not a chin implant is indicated. On occasion a receded chin has escaped detection when the patient posed for examination; unconsciously the patients bring their chins forward in an unnatural position to mask their deformities while being examined. After a careful critical examination one must be able to visualize and forecast the end results of the anticipated operative procedure.

In 100 cases in which operations were performed during the past eleven years, preserved rib cartilage was modeled and implanted beneath the mentum pad to reconstruct microgenic chins.[4] The patients' ages varied from 13 to 62 years. Despite the report of microscopic absorption, preserved rib cartilage was found quite satisfactory as a foreign body implant for this purpose. Fourteen patients with longstanding contour deformities were examined postoperatively: (1 after eleven years; 1 after eight years; 1 after seven years; 4 after six years; 3 after five years, and, 4 after four years. Absorption did not occur in any of these cases. The patients may be considered a fair sampling of the group as a whole. Every one of the 100 patients was followed postoperatively for at least six months, and absorption did not occur in this period. After four weeks, when the operative edema has subsided, one can accurately palpate the cartilage grafts. Clinically, by careful palpation, one can determine any marked amount of cartilage absorption. This has not occurred. The 14 patients who returned for yearly examinations have demonstrated that the new chin contours were permanent The cartilage was accepted in every case, and not a single graft was lost. These results are contrary to those reported by Dingmam,[5] who stated, "In several of our cases the preserved cartilage homografts has been absorbed and in other cases a foreign body reaction occurred that finally resulted in extrusion of the graft or has necessitated its removal."

Peer's studies[2] were made on cartilage

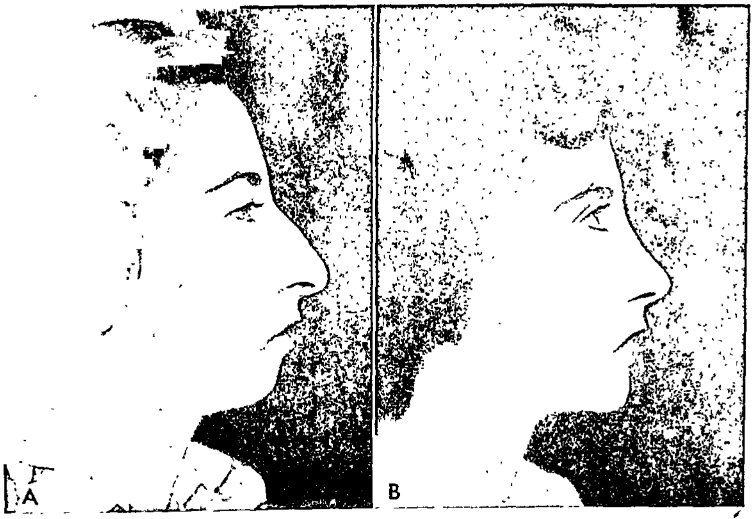

Fig. 2.—*A*, preoperative photograph. Concomitant nasal and chin deformity. Patient consulted s geon for nasal correction, was unaware of chin deformity. *B*, postoperative photograph, show result of combined nasal plastic operation and preserved cartilage

buried in the abdominal wall. The site in which cartilage is buried may have an important bearing on the degree of absorption. The abdominal wall is constantly in motion, owing to the mechanism of respiration. It is subjected to considerable irritation and trauma due to the movement of the belt and clothing besides the twisting and turning in every day motion and sleep. These irritating mechanisms may be responsible for the absorption noted in this study.

It has been observed that preserved cartilage implanted in the dorsum of the nose to reconstruct a saddle deformity undergoes absorption; mild in some cases, complete in others. In this particular site buried cartilage is poorly protected by the thin covering of the skin and subcutaneous tissue of the nose. It has been found that preserved rib cartilage grafts are frequently extruded from the dorsum of the nose one, two or even three years after the operation. Preserved septal cartilage transplanted under the mucous membrane of the nose undergoes almost total absorption. Here the extensive blood supply of the mucous membrane of the nose may account for the absorption of the cartilage. However, preserved septal cartilage or rib cartilage employed to reconstruct the rim of the orbit has proved lasting, and the contours were retained.

Large pieces of preserved rib cartilage transplanted under the mentum pad of the chin resisted absorption, and the modeled contours were maintained. One may hypothesize that the thick mentum pad acts as a cushion and protects the cartilage graft from trauma. It is my contention

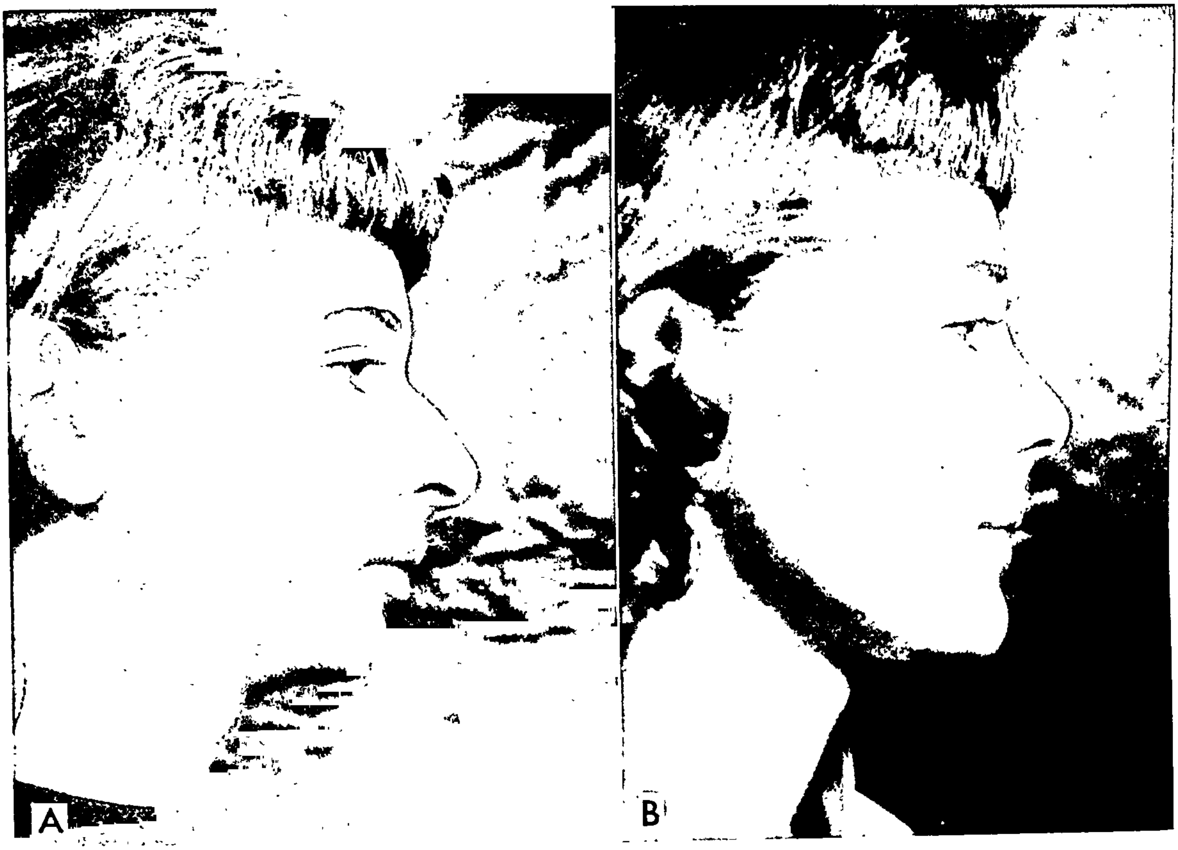

Fig. 3.—*A*, preoperative photograph. Concomitant nasal and chin deformity. Patient consulted surgeon for nasal correction, was unaware of chin deformity. *B*, postoperative photograph showing result of combined nasal plastic operation and preserved cartilage implant.

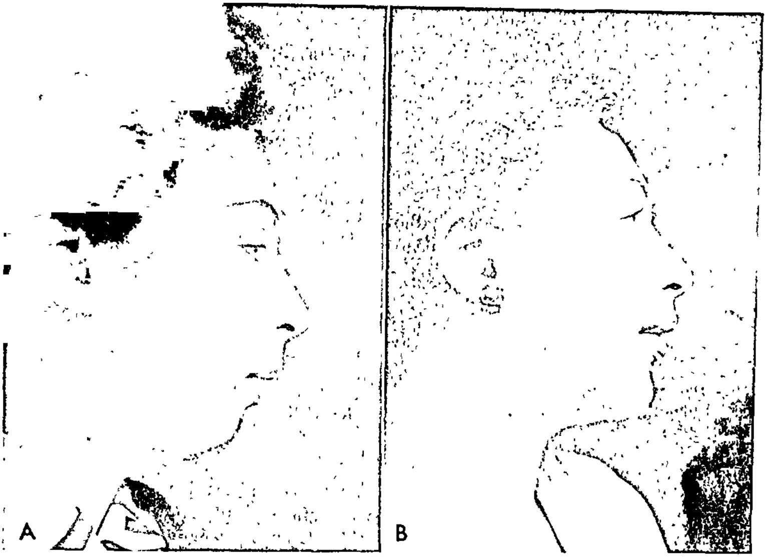

Fig. 4.—*A*, preoperative photograph. Second degree chin recession. Patient consulted surgeon for rhinoplasty, was unaware of chin deformity. *B*, postoperative photograph, showing result of preserved cartilage chin implant.

that the type of preserved cartilage and the site in which it is to be planted are important considerations in reconstructive surgery.

During the first three weeks after the operation, the cartilage chin implant may be easily displaced by accidental injury. The cartilage never becomes ankylosed to the mental protuberance. It becomes surrounded by fibrous tissue and is merely fixed in place. After five weeks the graft is firmly fixed by its fibrous tissue foreign body coat but can be freely moved from side to side. If, because of injury, the graft is displaced, the submental incision is opened, the adhesions are freed, and the graft is manipulated back into position. On occasion, a graft has been constructed too large. It was subsequently removed, remodeled and reinserted. On these occasions it was noted that a permanent thickening occurred in the subcuticular tissue surrounding the cartilage graft. This thickened subcuticular fibro-adipose tissue is the result of a foreign body reaction. In tends to balloon out the chin and helps to maintain a full, rounded chin contour. The thickening is permanent as long as the graft is in place. It is difficult to ascertain the amount of permanent thickening that occurs.

Preserved rib cartilage is advocated as a suitable foreign implant for the reconstruction of receded chins, for the following reasons:

1. There is a wealth of material, readily obtained, simple to preserve and easy to sterilize. A preserved cart[illegible] [illegible]k may be prepared and [illegible] [illegible] [illegible]fficulty.

2. Preserved rib cartilage is easy to cut and model. Premodeled, preserved rib cartilage grafts of all shapes and sizes can be always kept in readiness.

3. Additional operative procedures on the ribs, knees or iliac bone with the inherent risk of infection are eliminated. The additional discomfort and pain of these operative procedures are dispensed with.

4. With preserved rib cartilage in the surgeon's possession, the operation is a minor one, with no risk to the patient. It can be efficiently performed as an office procedure.

5. Preserved rib cartilage is well tolerated by the tissues. In this series of cases every graft was accepted.

6. Preserved rib cartilage implanted into the chin neither curls nor becomes distorted.

7. Large pieces of preserved rib cartilage were transplanted into receding chins in 100 cases. No visible absorption of the cartilage was noted in any of these cases for periods up to six months. Fourteen patients were examined four to eleven years after the operation, and no diminution in size of the grafts was detectable.

8. The percentage of infection in this procedure is nil. Antibiotics have never been used prophylactically. In this series only 1 immediate mild postoperative chin infection occurred, which healed spontaneously without specific treatment and without extrusion of the graft.

At present I have 1 patient in whom I implanted 7 large pieces of preserved rib cartilage to reconstruct a receded chin and one whole side of the face. In a three-year postoperative period no visible absorption of the cartilage occurred. One month prior to the time of writing an apical root abscess developed in a central incisor tooth, and the pus ruptured into the preserved cartilage pocket. It subsequently erupted through the undersurface of the chin to the exterior. After a course of antibiotic therapy and a suitable expectant period it may be necessary to remove the grafts to clear up the infection.

SUMMARY

Many different substances may be successfully employed to reconstruct the receding chin. Preserved rib cartilage has been found to be an excellent foreign body graft in 100 cases. Clinically, large pieces of preserved rib cartilage have resisted visible absorption and in those 14 cases examined postoperatively for periods up to eleven years have not diminished in size.

CONCLUSION

The incidence of excellent results in 100 cases of chin implantation performed during the past eleven years has proved preserved rib cartilage to be a satisfactory foreign body implant for the reconstruction of the microgenic chin.

ZUSAMMENFASSUNG

Die Häufigkeit ausgezeichneter Ergebnisse in 100 Fällen von innerhalb der letzten elf Jahre ausgeführten Kinnplastiken beweist, dass konservierter Rippenknorpel ein geeignetes Implantationsmaterial zum Aufbau des unterentwickelten Kinns darstellt.

RÉSUMÈ

Se servant du cartilage costale de réserve, l'auteur a refait 100 cas de menton avec succès durant les onze dernières années.

RESUMEN

La incidencia de resultados excelentes en 100 casos de implantación en el mentón realizada durante los últimos once años ha demostrado que el cartílago costal es un cuerpo extraño satisfactorio para la reconstrucción del mentón microgénico.

SUMARIO

Os excelentes resultados observados em 100 casos operados por implantação de "queixo" efetuadas durante os ultimos dez

anos pelo autôr, vieram provar que o emprego da cartilagem costal é oastante satisfatório para reconstrução do queixo microgênico.

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Developmental Abnormalities of the Head and Neck

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NO part of the body is immune to developmental abnormality, but the head and neck, containing so many important and complex structures, have a very large variety of such deformities confined to a relatively small area. Because of the proximity of one part to another, more than one organ or tissue is often involved, so that the deformity is mixed, as with cleft lip and palate, in which the nose, jaw, mouth and throat are all concerned. This makes any rigid classification almost impossible. In the limited space available it is impossible to list and discuss all abnormalities. Possibly the most important of the common deformities is cleft lip and palate, and this will merely be mentioned. It is a huge and complex subject in itself and demands separate and exhaustive consideration. In this paper I shall mention the common abnormalities and my views on their management. In addition, a selection of unusual deformities will be presented, with my experience in treating them. These last are included in the hope that my experience will be of aid if the

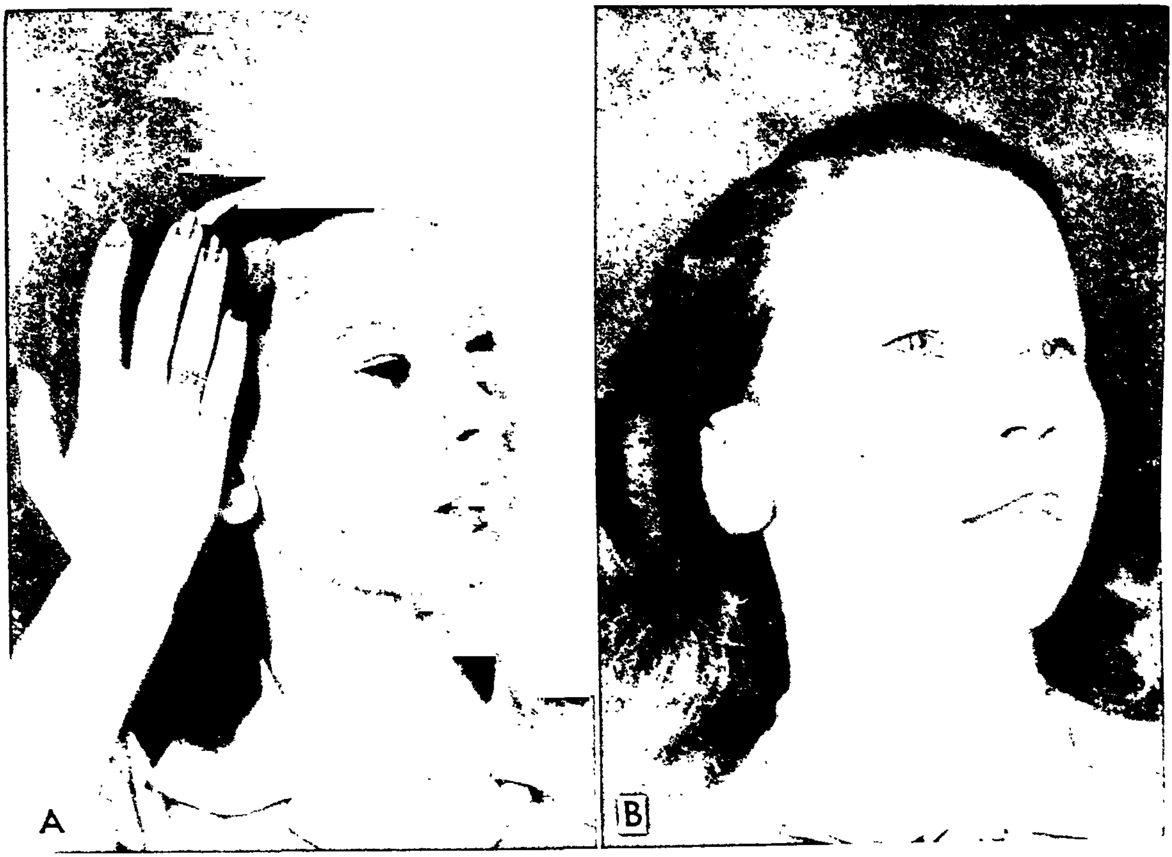

Fig. 1.—Verruca removed in one stage.

From the Straith Clinic for Plastic Surgery, Detroit.
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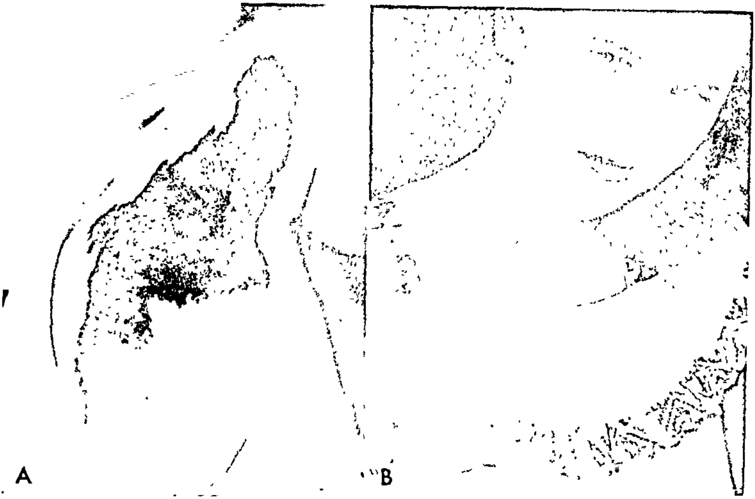

Fig. 2.—Hemangioma removed by multiple excision.

reader should encounter a similar deformity. Many times I would have been grateful for such help if I could have found it. The tissues in general will be discussed first and then the organs.

Tissues in General.—Skin: The principal anomalies of the skin are the hemangiomas, the nevi and the verrucae. The hemangiomas are usually easily identified grossly, but the other cutaneous lesions often present difficulties. The literature contains so many conflicting terms and classifications that for years I was confused. In addition, these lesions can be mixed. It is my opinion, therefore, if one bases his differentiation entirely on the microscopic appearance it will be easier and clearer. If a lesion consists of blood channels it is a hemangioma; if it contains nevus cells it is a nevus, and if it presents the typical epithelium-covered stalk it is a verruca.

A hemangioma may be capillary or cavernous, depending on the size of the blood channels. This lesion could well be considered an anomaly of the vascular system, but since it usually involves the skin, it is best considered here. Lesions with very fine channels produce the strawberry mark, larger channels the so-called purple birthmark and still larger channels the cavernous hemangioma. The first two types are commonly flat, whereas the cavernous type is often tumorous. Whether they are ever malignant in the commonly accepted sense of the word is a moot question. To me it seems that the lesion is essentially a deformity. I have seen hemangiomas that were growing and spreading, but this may have been caused by the natural growth of the patient and the rising blood pressure opening additional channels. This spreading tendency seems not to occur in adults. While visiting Dr. Owens, it was my privilege to observe an extreme case of spreading hemangioma of the head in a young baby. Th
scopic picture showed great cell

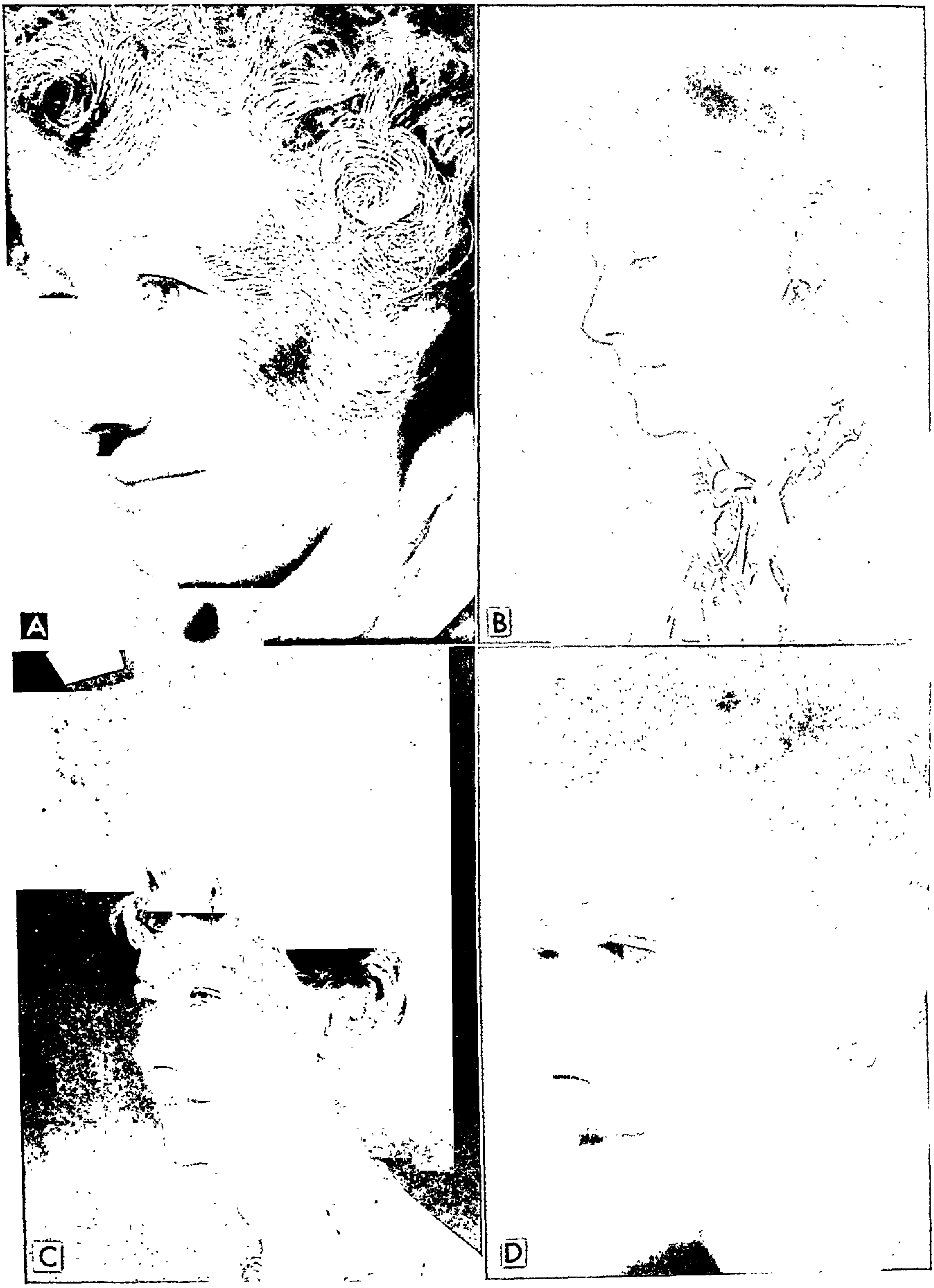

Fig. 3.—Hairy nevus removed by multiple excision.

ity. Despite an apparently hopeless prognosis, the hemangioma was eventually controlled with sodium morrhuate injections. Since there can be no question in such a case of eliminating all of the cells, it seems reasonable to me to conclude that the lesion is not a tumor.

As to treatment, I am convinced that no one method is best in every case, as there are many things to be considered. In the case of the flat strawberry mark or purple birthmark (capillary hemangioma) one must consider size and location. If excision is practical in one or more stages, this seems to me preferable. It is clean and permanent, and its final result is a line scar. A rough rule is that lesions up to 3 cm. in diameter can be excised in a single stage (Fig. 1). Larger lesions are best excised in multiple stages (Fig. 2). Overambitious attempts to excise large lesions in one stage are not satisfactory. Tension is so great that the scar spreads and another corrective procedure must be done. No time is gained, and more normal skin is sacrificed.

When the extent of the hemangioma is unusually great—e.g., when there is continuous involvement of the cheek, ear and neck, the course of treatment must be considered carefully. If the skin is perfectly smooth, the contour normal and the patient a woman, I prefer in most cases not to operate. The cosmetic "Covermark" properly applied hides the lesion completely, and the result is much superior to any surgical procedure known to me. In the case of the male patient, cosmetics are obviously not very practical. Once again, if the skin is smooth and the contour normal, I am of the opinion that the completely normal-appearing tissue, except for

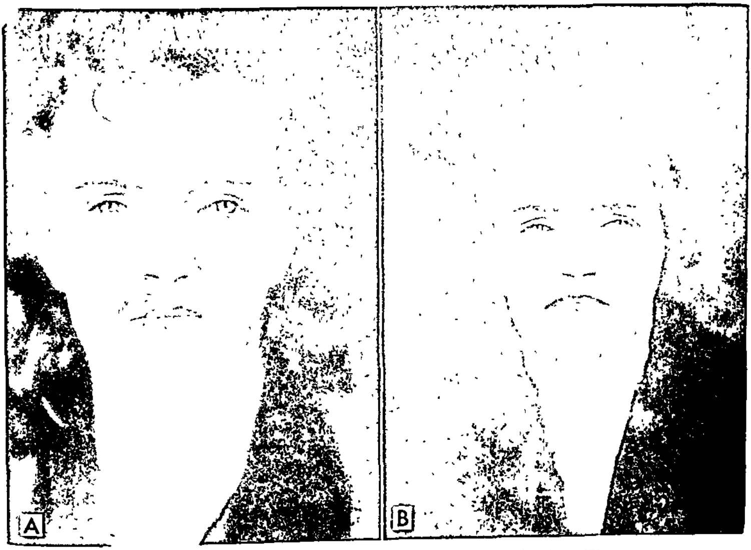

Fig. 4.—Nevus excised and replaced by nasolabial flap.

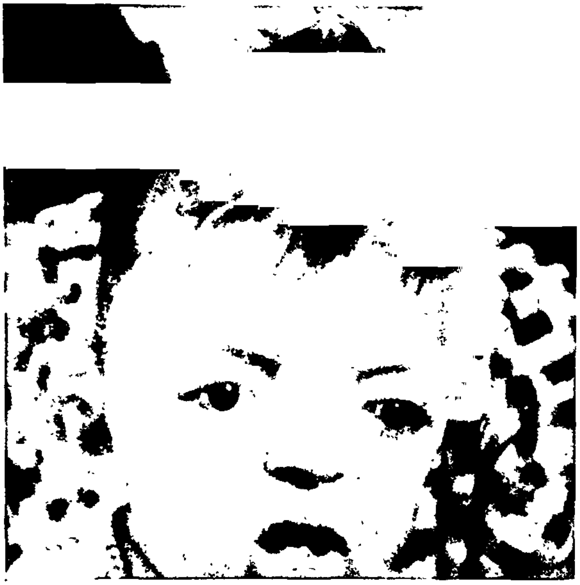

Fig. 5.—Turret skull.

the one factor of color, satisfies the eye more than an area scarred by many incisions or covered by a graft, which is perforce surrounded by scar and the color of which may be very different from that of the normal skin in the neighborhood.

Of course, if the mark is dark purple it may be so unsightly that even a graft that is far from a perfect match is preferable. Occasionally the involved skin surface is marred by excrescences. If so, one is obliged to remove the lesion. If it is within reason, multiple excision is preferable to grafting. There are many cases, however, in which free grafting is the method of choice. When one begins to speak in terms of dozens of operations, the cost to the patient in time, money and suffering can become extremely great. In some cases it is questionable whether the final result is an improvement sufficient to warrant the great and prolonged effort.

When the hemangioma involves structures such as the eyelids and nose, great caution should be exercised. It is not the part of wisdom to remove the discolored skin and substitute structural distortion and deformity. In this limited space it is impossible to analyze these situations in detail; each case is different and is a study in reconstructive surgery. Grafts and flaps are used in great variety. Treatment of a condition of this kind should not be undertaken by any but a trained and experienced person.

As to nonsurgical methods, I have not found the injection of irritants such as sodium morrhuate to be practical for capillary hemangiomas. Roentgen therapy has not been successful in any case I have observed. Tattooing with pigments is done by some workers. I have not done this myself. I have seen a number of patients so treated elsewhere; I thought most of them improved but thought also that a skin graft would have produced even better results.

The cavernous hemangioma presents a different problem. Here the abnormal color is only part of the picture. In addition there is a tumorous mass, often raised far above the level of the skin and sometimes extending deep into the tissues. In some cases important structures, such as the nose, lips or eyelids, are seriously involved. It is in these cases that limitation

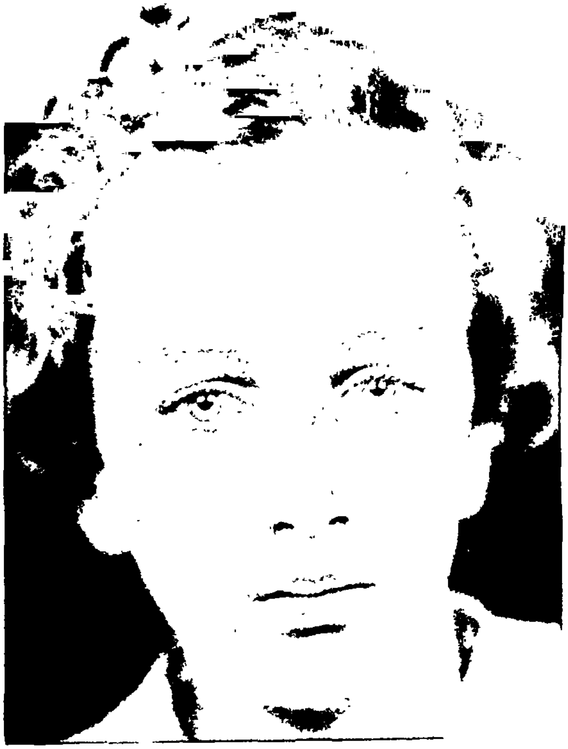

Fig. 6.—Prominence of right frontal boss.

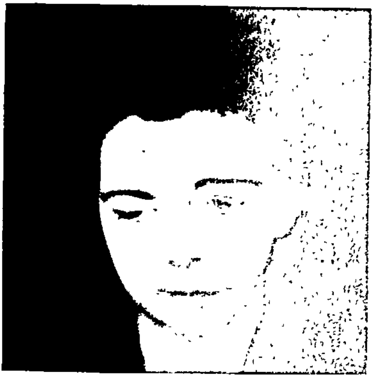

Fig. 7.—Deficiency of left half of frontal bone.

and shrinking of the tumor by fibrosis has its great field. Some prefer to accomplish this by injection of irritants, others by use of radium or radon seeds.

Once again the decision whether to excise the lesion or treat it by injection depends on size and location. Small and medium-sized lesions of the scalp, cheeks and neck are easily excised and the matter is ended. To spend time and effort in preliminary fibrosing procedures seems pointless to me, since in the end the lesion must be excised. If, however, the lesion is very large or involves important structures, the opposite is true. Immediate excision might completely destroy the anatomic integrity of the part and possibly produce dangerous hemorrhage. In these cases preliminary fibrosis is very valuable. Personally, I use sodium morrhuate. It is not the only agent, but it works well and has stood the test of time. The lesion is injected until the tissue is tense. Ulceration occasionally occurs but does no harm. Injections are repeated at intervals of two to three months until the lesion is well shrunk and fibrotic. Excision and closure or replacement by graft or flap can then be done. In the case of infants I usually wait until the child is about five years of age before beginning this phase.

Nevi· These are the so-called moles and are very common. They vary in size from pinhead dots to giant-sized patches. They are usually hair-bearing and, depending on their size and position, can be very unsightly. A genuine nevus contains nevus cells. If the growth does not contain these cells it is not a nevus, although it may appear grossly to be pigmented. There is much fear on the part of the laity and even members of the profession as to the malignant potentiality of these lesions. In actual practice this must be extremely slight. Personally I have never known malignancy to develop in one of these common multiple or giant moles, and I have talked to many experienced pathologists whose experience has been similar. This is not to say that it never occurs, but when one considers the enormous number of such lesions, the incidence must be very low.

The principal reason for removing a nevus is its unsightliness, and the same principles employed for the flat capillary hemangioma apply to the nevus. If the size and location of the nevus make it possible simple excision suffices. If it is too large for this or if it involves important structures, multiple excision in stages or, in some cases, grafts and flaps must be employed (Figs. 3 and 4).

Verrucae: These are strange structures and are much less common than the hemangiomas and nevi. They are usually greyish brown and have a crumbly, warty surface. Although unquestionably congenital defects, they are usually indistinguishable microscopically from other warts caused by a communicable virus; however, they never show any tendency to extend or to produce seedlings in other areas, and they are not communicable. They are treated in the same way as the nevi, the procedures in order of preference being simple excision, multiple excision and a graft or flap procedure (Fig. 1).

Bone.—The anomalies of bone are less common than those of the skin, but of much greater variety. Some are incompatible with life, occurring only in monsters. Others, though of congenital origin, are manifested mostly during childhood

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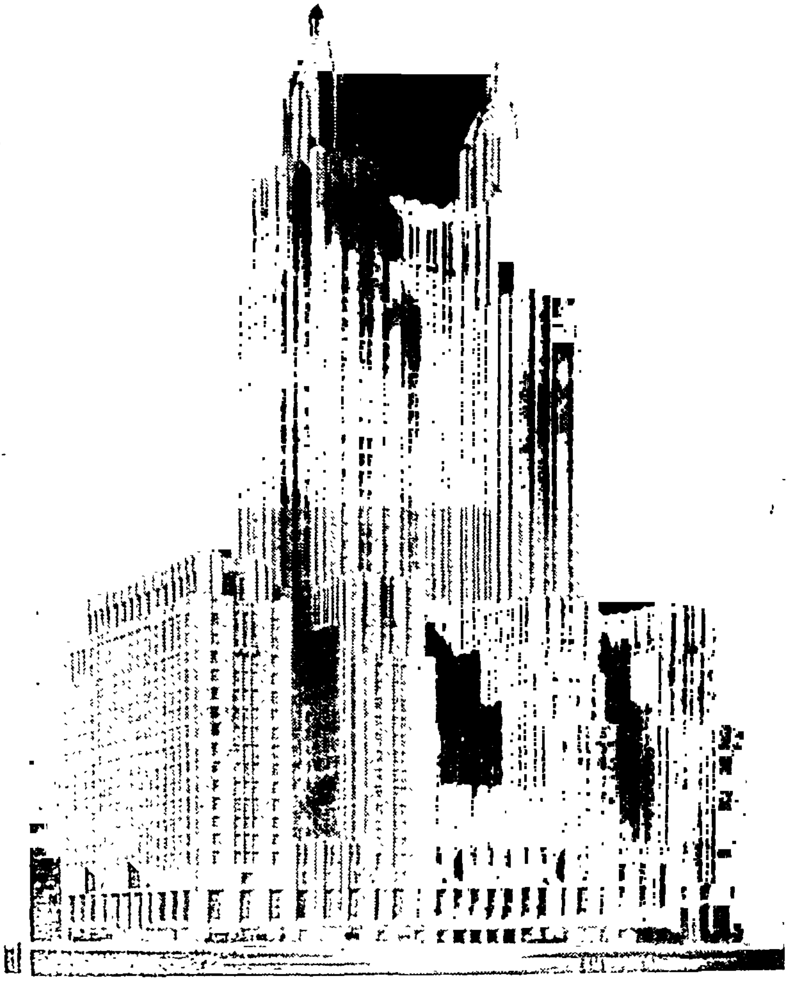

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